

DECEMBER 2, 1987  
VOLUME 21, NUMBER 48A  
\$2/COPY, \$44/YEAR

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Special Section: SQL & DB2



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C. Communications Systems

D. Office Automation Systems

E. No Computer Involvement

# in focus

## SYSTEMS RENOVATION

Re-engineering old or outdated systems can save most organizations both money and hassles. However, although publicity about new and effective restructuring tools is helping spread the word, systems renovation is still regarded with a wary eye by systems professionals, users and top management. By exploring all the systems options before implementing a change, however, you may discover the benefits of rebuilding rather than buying. By Connie McCandless. Page 18.

## A LITTLE PLANNING GOES A LONG WAY

Project management software is increasingly being called upon to help users automate the planning process. Running on machines from mainframes to micros, project management tools can handle enterprises no matter what their scale. And the users *Computersworld Focus* recently spoke with couldn't agree more. Read about the project management activities of the XV Olympic Winter Games Organizing Committee, Carolina Power & Light and defense firm Loral-Conic. You may even see a little bit of your company in their experiences. By Rebecca Hurst. Page 21.

### Expert systems in finance

By Anne Lovett. Expert systems applications were for a long time confined to the science field, one area that has traditionally concentrated many of its R&D dollars on AI-based technologies. But that situation is changing, and expert systems are moving away from the purely scientific and experimental to the more mainstream and commercial. Learn how the financial industry is leading the way in expert systems. Page 15.

### Tools for group productivity

By Patricia Seybold. The era of personal productivity has given way to that of group productivity. Today's business environment does not allow anyone to make decisions in a vacuum; hence, the need for tools that facilitate teamwork is ever-more urgent. This analyst discusses the cooperative trend and looks at products that ease the complexity of working together. Page 35.

### The success of C

By Stan Kolodziej. Long regarded as a programming star in the micro-computer field, C is gaining followers in the mainframe programming world. Acceptance isn't going to be easy, however. C is following a path strewn with other languages that have tried to usurp Cobol's position in the mainframe commercial environment and failed. But C is not other languages. Its special qualities and IBM's blessing may break down mainframe resistance. Page 39.

COVER BY WARREN GEBERT



### SQL & DB2 watch

Whether on their own merits or through IBM's marketing clout, the DB2 relational DBMS and its query language, SQL, have become standards in the data base field. In this month's Special Section, Michael Tucker analyzes the strategies of the independent software vendors in the aftermath of DB2, while Stan Kolodziej examines the turmoil in the DB2/SQL market. Begins on page 27.

### From the Editor

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A Wall Street broker is bullish on a Unix, Sun combination at his firm. Page 5.

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Jim Young on how to keep critical MIS projects on track. Page 5.

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Packaged software forecast to 1992. Page 48.

Special Edition 1987

Volume 5 Number 4

News From  
VM Systems Group

# V/UPDATE

## V/SEG Ends DCSS Headaches!

### Announcing V/SEG

In the early 1970s, Release 1 of VM/370 offered the twin tools of "saved systems" and "DCSS" for improving system efficiency. Since both saved systems and DCSSs can be shared among many users, they allow a single copy of software to be part of, or attached to, multiple virtual machines, eliminating the need for private copies and reducing the system's sum of working sets. DPMST was typically changed infrequently, since CMS definitions usually varied only at VM Release boundaries and not much software was executed in shared storage.

As VM systems grew to support thousands of users instead of dozens, as more software products (from IBM and other vendors) supported execution in DCSSs, and as system administrators became more sensitive to wasting real storage on multiple software copies, DPMST maintenance became a more visible roadblock to system administration. Several problems emerged:

1. Selecting virtual memory addresses for software execution became harder, as the available 16 megabytes became more crowded and as inter-relationships between software packages became more complicated and less predictable;
2. Installing new versions of DCSS resident software required changes to DPMST, endangered production copies of software, and inconvenienced users or required off-hours work; and
3. Any DPMST changes required a VM system generation, SHUTDOWN, and system re IPL.

We are delighted to announce the antidote to your DCSS headaches: V/SEG. V/SEG provides a mechanism by which a DCSS can be part of an "automatic" group, used to dynamically assign and load a DCSS into a virtual machine to eliminate one DCSS overlaying another. Autofit groups reduce planning and management problems associated with DCSS definitions. V/SEG extends the CP SET and QUERY commands to provide a dynamic renaming capability for saved systems and DCSSs for all or specific users without the need to IPL the system. And, it provides a "NOTIFY" option to inform users

when a requested DCSS has been processed by V/SEG, otherwise DCSS substitutions remain transparent to the user.

Finally, V/SEG can replace the on-line system name table (DPMST) without a SYSOEN or IPL. This allows installing new products or product versions and correcting DCSS or saved system definition errors whenever desired without disrupting system usage, or providing information work. A V/SEG command provides information on alias assignments in effect, and can determine who is using a particular DCSS or saved system: a mapping utility provides a graphic representation of virtual memory allocations for software, selecting virtual memory addresses for software execution and identifies overlapping definitions. Call VM Systems Group for information on how V/SEG can simplify your DPMST management!

### 9370 Users Need Love (and V/UPDATE) Tool

As IBM begins shipping 9370 processors (systems, really, since most 9370s will be completely rack mounted), a new class of VM installation will emerge. The new VMs will probably not have a background in IBM mainframe computing, and

will install the 9370 (and perhaps VM/IS) as a "turnkey" system with IBM software and support. Sites and system programmers who have benefited from local and national user groups can "pay back" what they have received by helping locate these new VM sites and making them aware of the large and vibrant VM community that awaits them. If you know of 9370 sites, encourage them to join local VM user groups, and to contact VM Systems Group for a free subscription to V/UPDATE. We will send you a free *Orin and Bear II* T-shirt for each new 9370 site/initial contact you tell us about.

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## Q AND A

## Paul Sobota

Limited by DOS-based PCs, Wall Street broker is bullish on Unix, Sun combo

The Unix operating system has been fighting an uphill battle for acceptance in the commercial environment for some time. Recently, however, it has found an unlikely ally in the financial community of Wall Street.

Major brokerage houses that began acquiring Microsoft Corp. MS-DOS-based personal computers a few years ago are finding that the systems no longer have the muscle to handle their applications.

To handle increasingly sophisticated programs, some brokers are turning to Unix-based workstations from Sun Microsystems, Inc., located in Mountain View, Calif., to provide more hardware and software horsepower.

One such broker is Paul Sobota, vice-president of formula trading for Kidder, Peabody & Co. in New York.

Sobota recently spoke with *Computerworld Focus* Senior Writer Rebecca Hurst about his reasons for switching to Unix-based computers and the benefits that these systems provide.



**Why did you move your software to Unix?**

As our applications became more sophisticated, we outgrew the IBM Personal Computer ATs we had been using. They were just too slow. We also needed a more sophisticated operating system. It was impossible to do several tasks at one time using MS-DOS, and that [limitation] was very inconvenient.

Microsoft was supposed to introduce multitasking MS-DOS for the AT, but its availability kept eluding.

I thought Unix was just used in universities and engineering environments. I had never heard of it used in financial applications. When I started inquiring, however, I found that Smith Barney, Harris Upham & Co. and Bear, Stearns & Co. were using Sun workstations. A lot of people on Wall Street have Sun workstations and Unix.

Even though Unix is not widely used [in the commercial sector], it has been around for years. It's a stable operating system, and it is easy to find vendors with

software written for Unix. That was comforting because I knew we wouldn't be locked into the software we wrote ourselves.

**Why did you choose Sun workstations?**

About 18 months ago, Sun invited us to a conference for the financial community and presented us with solutions using its workstations. While I was there, I learned that the APL Plus development language [from STSC, Inc.] we used on MS-DOS was available in Unix. I realized it would be easy to convert the software we had written on the PC AT.

Once I knew APL Plus ran under Unix, I looked at a half-dozen workstations, including systems from Hewlett-Packard Co., Perkin-Elmer Systems Corp., Agilent Computer, Inc. and IBM. Sun offered the best performance for the price.

**Did you face any resistance to Unix from other Kidder Peabody brokers?**

The Sun workstations are still considered personal systems, so I didn't have to get the department head's approval. But I did have to convince the partner who works with me.

Initially, he was reluctant to use Unix because it is an intimidating operating system. It is very large and has a lot of features and obscure commands. Even now, there are things I don't know because there is so much to it. It was not too hard to

convince my partner, though, because we were using the same software tools on Unix that we had on MS-DOS.

These have been a security blanket for both of us as we learned about Unix. Now, my partner is happy that we chose Unix on the Sun.

**How has the use of Unix-based Sun workstations grown at your firm?**

In August 1987, we began with two diskless workstations networked to a file server. At the time, our group had three people. Since then, we have added three diskless nodes and hired two more people.

Some trading groups have begun looking at how we are using Unix. One group has eight PC ATs, and none of them can talk to each other. The people in that group are frustrated at having eight independent machines. Also, groups have hired brokers that used Suns at other firms on Wall Street. These employees are requesting Sun workstations for their groups.

**How is your group using its workstations?**

In addition to one workstation used as a file server, we have one workstation that monitors activities on the trading floor. Another is used to send trade transactions down to the trading floor, and a fourth is a clerical system that watches our trading strategy. Working with a real-time ticker feed, we use these work-

stations to get stock prices from the floor, analyze them in our APL stock model and run our transactions back down to the trading floor.

Our two programmers are using the other Suns to develop strategy software. One developer is working on an artificial intelligence system to watch the market position. The other programmer is developing code to access prices from the New York Stock Exchange.

**What benefits have you gleaned from using the Sun workstations with Unix?**

Because the Suns are networked, it would be very easy to tap in a more powerful machine if our needs grow. The local Sun stations could still provide a smart interface and would be sufficient for screen I/O.

Another benefit is that Unix is a standard operating system that can handle sophisticated programs. We had problems hiring programmers to work on the PCs because they found the computers limiting. Because we have Unix, we have all kinds of people who want to work with us.

Unix also is allowing us to experiment with the AI language, LISP. We are working with LISP to develop a program that will help us to determine whether stock trades will be profitable or unprofitable. Developing - this software on the AT [under MS-DOS] would have been impossible.

## MANAGER'S CORNER

# To do: Getting MIS tasks going

Jim Young

One of the first lessons an MIS manager learns is that advising the MIS department is easy. That's because he gets so many suggestions about how to run it. Many of these recommendations are reasonable and even desirable. But MIS managers also quickly discover that acting on a great idea is hard.

I recently was a bystander at an audit of another MIS department. As the review proceeded, the list of technically correct things to do became longer and longer: update documentation,



test the data recovery plan, build a disaster recovery plan, formalize the training plan, strengthen the applications planning process, expand coding standards, build a personnel succession program, tighten the quality assurance program and so on.

As intimidating as this long list can be, the real intimidation comes when you discuss the problems with specialists who fixate on an idealized approach. Many times, this ideal is not attainable; hence, MIS managers need to know when and where to compromise.

Although effective, a specialist's advice may be unrealistic because it typically includes thorough, resource-intensive

high-visibility approaches, such as the dedication of staff, the formation of new organizations with narrow responsibilities, heavy management sponsorship, full department participation and broad communications and training. It is impossible to give each project on the list this type of undistracted attention.

As a result, many critical projects or duties may go unaddressed as MIS managers defer to the admonition, "If I can't do it right, don't do it at all."

Or more likely, MIS may cling to the naive hope that once it gets past the first blockbuster tasks, other projects can be tackled. Unfortunately, many activities may wait for years to be done, deferring to time-sensitive applications projects or operational crises that always seem to take precedence.

## Prioritize

But there is another way. As the mountain of MIS housekeeping is reviewed, there will admittedly be one or two areas that, based on your assessment, deserve a higher level of attention and resource commitment than other projects.

However, just because other projects cannot share center stage does not mean they should

be abandoned. There are a few alternatives MIS should consider before consigning needed tasks to next year's wish list.

• **Outside help.** Even though we often hear that important projects need in-house attention and expertise, many can be handled in part or in whole by people from outside your organization. You do always have to resort to full-time consultants on an expensive time-and-materials basis or on a convoluted fixed-price contract.

Local schools or training programs often have inexpensive internship programs available for students with skills that can be applied to projects like documentation. While this solution may require some supervisory attention, it does not have to be a major drain on critical resources.

Check with your personnel department or user department; similar help might already exist within your organization. What you give up by using assistants who lack a data processing orientation, you may gain by using people who are familiar with the applications and environment.

Whether you use students or in-house users, you can reap dividends that you would not have seen from a strictly internal project - potential employees in the

one case and better educated, more sympathetic users in the other.

If you need higher level talent on a tight MIS budget, don't despair. Training programs can be initiated without spending a fortune. Contact a local university's special program administrator or a key faculty member to see what the school has to offer in terms of training. Many institutions find professional education projects a good way to increase facilities use, maintain ties to industry and generate revenue.

And creative solutions need not stop there. Today, many companies are banding together independently or through professional organizations to cut education costs by offering joint training.

Certain project types may have similar solutions; disaster recovery has been a popular mutual-aid program for years. Co-operative training efforts like this take a little coordination but can yield great benefits.

There are other advantages to going outside the department for help. Resources outside the MIS department can interpret objectivity, and, because they have no permanent presence in the company, they can serve as a

Continued on page 6

## Manager's corner

Continued from page 5

means for introducing volatile issues or instituting unpopular recommendations into the department. Also, a fresh perspective can introduce new technology as well as promote experience sharing — a critical part of a healthy MIS department.

• **Temporary assignments.** Should you be plagued with a project that you feel requires experience but that your staff just can't seem to find time for, consider temporarily assigning someone from the ranks to it for a specified length of time. Key projects, such as standards development or an important analysis, may bene-

fit from the fresh approach a new face may bring.

The person assigned also benefits. Not only does the task develop skills the worker might need for advancement, but the variety the work provides might be just the thing for someone stuck in a rut. The accolade of entrusting an employee with a special project is a real motivator.

The temporary approach itself has some fundamental virtues. It provides the intense effort required by long-neglected projects. Because the project is full time, it eliminates daily distractions, and because the project is finite, it is unlikely that an empire will form as a result of the worker's recommendations — especially if the project manager has no ongoing

hand in any of the eventual activities spawned from the project. These are advantages to consider even if you are not short of resources or manpower.

• **Collateral duties.** Occasionally, there are activities that cannot be handled by detached outsiders or by a temporary activity. A full-time dedicated effort is needed to deal with continuing MIS programs such as security, quality assurance and planning. Because the usual limitations generally prevent the proper attention, a reasonable alternative is to assign the task to a member of your staff as a collateral, or additional, duty.

Although MIS managers need to avoid overloading already taxed personnel, good workers can usually find a way to get

the important tasks done. Talented people may welcome new challenges and extra responsibilities as a professional reward. It is a way to recognize hard work and to further on-the-job development.

Of course, you should be careful not to combine conflicting duties or violate a system of checks and balances. However, by searching for the right organizational home for a function, compatible areas can often be found with resulting synergies. There may even be work efficiencies in these arrangements, such as letting data base administration run your end-user data access program.

In general, you will find that a decisive approach toward getting necessary MIS work under way will unearth many solutions for each problem caused by resource shortages. As necessary but undressed work mounts, there is more reason than ever to discover ways to attack it. Don't be misled by advisors who condemn the shoestring, or piecemeal, approach. Those who delay a task until it can be done precisely will wait forever.

MIS managers should remember that it is more important to do the right things than to do things right. To that end, MIS must be creative with the organizational tools it has and cultivate the strengths found in alternatives to traditional pariet approaches.

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## Letters

Continued from page 3

I was especially pleased by the comment in the first article: "To get true benefits from [computer-aided software engineering] technology, managers must develop a system for getting users involved in the design of the applications they use. Then you'll not only provide solutions faster, you'll be solving the right problem."

Intelligent Micro System, Inc.'s Prodoc software system and methodology addresses that concern. Prodoc is a CASE product that supports the entire software development process.

It is easy to get a user involved with specifications because Prodoc can execute high-level design in English and can show sample displays. Modifications can be made here before any code is written.

Alice B. Scandura  
Director of External Research  
and Development  
Scandura Intelligent Systems  
Marlboro, Pa.

## Vendor expects legendary developments for UIMS

I found the July 8th *Computerworld* Focus article on user interface management systems (UIMS) well-written and on target. I firmly believe that a UIMS revolution will happen soon.

Master Computer Systems, Inc. has a UIMS that has been commercially available since April 1986.

We are in the process of changing the product's name to *Legendary User Interface* from *Formix Screen Management System*. It has evolved from a simple screen manager to a full UIMS that is both language and data base independent.

Dennis Morstad  
President  
Master Computer Systems, Inc.  
Eden Prairie, Minn.

# news & analysis

## UPDATE

### Buying software expertise

The age of software company mergers and cooperation is still going strong.

The purchase of software vendor Uccel Corp. by Computer Associates International, Inc. a while back seems to have signaled the go-ahead for a lot of company-to-company movement the past few months, especially in the data base market. It is a case of some companies finding that, in certain situations, it makes more sense to buy or comarket technologies than to develop them. Sybase, Inc., for example, is being wooed by both Microsoft Corp. and Apple Computer, Inc.; Innovative Software, Inc. and Informix Software, Inc. are planning to merge; and the list goes on.

One area seeing a lot of activity is the IBM OS/2 data base market. Despite the fact that software developers do not yet know the data base component plans for IBM's OS/2 Extended Edition, Sybase is apparently working on an OS/2 product that provides an IBM SQL interface and data base management capability.

Both Ashton-Tate Corp. and Microrim, Inc. are developing OS/2 data base products that they hope will be available when OS/2 Extended Edition makes its appearance.

### Software firms not immune to stock roller coaster ride

The stock market seems to think data bases are hot — at least it did until October. Before the October Wall Street crash, the stocks of two software data base management companies, Oracle Corp. and Informix Software, Inc., were among the top five performers during the third quarter of 1987. Afterwards, however, their stocks joined the roller coaster ride of other software vendors, such as Lotus Development Corp. and Microsoft Corp.

At last look, the market was fortunately on a gradual upswing. Industry analysts, however, were cautious about the long-term effects that the sudden market downturn will have on the software industry.

Some analysts say many areas of the software industry, es-

pecially large mini and mainframe software systems, will be sheltered from the turmoil because of their strategic importance to corporations. Others predict a more conservative entrenchment by MIS and a harsh accounting of the importance of software purchases, especially at the microcomputer level.

### Microsoft downplays foray into Lotus 1-2-3 territory

Microsoft Corp., for one, is hoping that spreadsheets will be immune to the turbulent stock market. The company recently introduced a version of its Excel spreadsheet package that can run on IBM Personal Computer ATs and compatibles. Lotus Development Corp. tried to steal some of Microsoft's thunder by announcing that — surprise — it is fast developing an Apple Computer, Inc. Macintosh version of its 1-2-3.

Actually, Microsoft, despite some chest-thumping and product hoopla, seems to be playing down its excursion into Lotus land, claiming Excel will be a success but that it is not expecting to make 1-2-3 obsolete.

The company might be right in playing Excel down a bit. Despite the fact that the spreadsheet has one big advantage over 1-2-3 — namely the Microsoft Windows graphical user interface — it might elicit yawns from corporate users. For one thing, with training time and costs going up, it could just be too much trouble for organizations to make the switch from 1-2-3.

"Also, the Lotus 1-2-3 add-in market is very strong and gives 1-2-3 users a lot of options to improve on their spreadsheet use," explains David Thomas, technology analyst at Hambrecht & Quist, Inc. in New York. "Excel doesn't yet have that kind of [third-party] support."

### Developers Kit gets update; IBM ups OS/2 release date

Updating the IBM/Microsoft Corp. OS/2 development story, Microsoft has indicated that the December upgrade to the firm's OS/2 Developers Kit will contain some critical components

*Continued on page 14*

## VAX software close-up

Installed application packages in DBMS\* vs. non-DBMS sites



\* Data base management systems

INFORMATION GATHERED FROM A 1987 COMPUTER INTELLIGENCE SURVEY OF 3,300 DIGITAL EQUIPMENT CORP. VAX SITES IN THE U.S.

GRAPHIC BY BRUCE SANDERS

## Directory lists fed's public domain software

Source Translation & Optimization, a start-up based in Belmont, Mass., has announced a new directory to public domain software available in source code from the federal government. The 150-page "Government Source Code Directory" lists more than 8,000 software programs, ranging from MIS applications to modeling programs for supercomputers, that can be obtained at low or no cost from government and military organizations.

The directory costs \$30. It is available either in hard copy or in machine-readable form.

The U.S. federal government is the single largest producer and consumer of software in the world. Its library of program titles runs into the millions. Because much of this software is developed by the government or by contractors at the taxpayers'

expense, it is considered public domain. Any MIS director could, therefore, obtain and use any number of well-crafted federally developed inventory control programs, accounts payable packages, bookkeeping programs and so on — all in source code, all rigorously documented as per government regulation and all available for machines ranging from IBM MVS/3A-based miniframes to personal computers.

The trick is to find the software in the first place. Though the government is more than willing to make the software available to the public, it maintains no central repository to keep track of all the different development efforts it supports. Literally no one, in the government or outside of it, has any

*Continued on page 14*

IBM's Application Systems Division: A force to be reckoned with. Page 9.

# Unix-to-DOS tools boast 32-bit 386 power now

The market for products that let Microsoft Corp.'s MS-DOS run under Unix is growing because of the availability gap between Intel Corp. 80386-based personal computers and Microsoft's version of OS/2 for the 386, according to Michael Gouldie, a senior analyst for a Boston-based research firm, The Yankee Group. Users are demanding solutions now.

While Microsoft's MS OS/2 can run on 386-based machines, it was designed only to use the 16-bit address structure of the Intel 80286 chip. Therefore, OS/2 does not take advantage of the 386's 32-bit architecture, Gouldie claims. With Unix-to-DOS products, however, users can run MS-DOS applications using the full 32-bit power of the 386 and can take advantage

of Unix's multitasking and multiuser capabilities.

Other MS-DOS replacement or enhancement products, such as Atlanta-based The Software Link, Inc.'s PC-MOS and Santa Monica, Calif.-based Quarterdeck Office Systems' Desqview, provide degrees of higher address space, multitasking and multiuser support. However, Gouldie notes, most of the vendors of these products do not have the list of impressive strategic alliances and OEM deals that such leading Unix-to-DOS vendors as Locus Computing Corp. and Interactive Systems Corp. have.

Interactive Systems, located in Santa Monica, working with Phoenix Technologies Ltd. in Norwood, Mass., has joint

marketing deals with AT&T, Microsoft and the Santa Cruz Operation, Inc. Locus, also in Santa Monica, reportedly has agreements with Microsoft and IBM. Because of these agreements, "Interactive and Locus products are seen as safe bets," Gouldie explains. "But at the same time, both are relatively expensive solutions," he adds.

Yet the higher cost of such offerings reflects higher performance, asserts Michael Lewis, Locus's marketing manager. "I wouldn't suggest that someone who just wants multitasking buy our Merge 386," he says. "There are MS-DOS-only multitasking solutions that may be appropriate for some users."

But MS-DOS cannot solve all problems. Some users have the need for power and multiuser capabilities that justify the cost of a Unix solution, Lewis explains.

And the market seems to bear out his assertion. Within four days after an introductory offer for Merge 386, Locus reportedly garnered \$100,000 in sales.

The Oct. 15 offer for a two-user version of Merge 386 included MS-DOS 3.2, a runtime version of AT&T Unix System V Release 3 and Merge software and documentation. The cost during the offer, which ended in November, was \$386—\$300 less than the usual price.

Locus also offers a \$1,195 version that supports an unlimited number of concurrent users. "Ironically, many people were drawn in by the low (\$386) price, but they paid \$1,195 to get the unlimited-user version of Merge 386 instead," according to Lewis.

Similarly, Interactive Systems has sold more than 200 copies of its VPIX Unix-to-DOS product within its 386/IX Unix product to people who want to sample Unix's capabilities, reports Betty Mann, vice-president of Interactive's product division. "We're also lining up several distributors and OEMs" to distribute copies.

In all, Lewis says, "The fact that so many people are willing to spend money is an indicator that the market is right for this kind of solution." — RH

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# Division aims to boost IBM's software presence

Here comes IBM again. Whatever IBM does, it does in a big way, and the Application Systems Division (ASD) is no exception. The company is committing billions of dollars and several thousand people to make ASD a force to be reckoned with in the 1990s software market. ASD's mandate is to make IBM the leading software applications supplier to the world.

Not that IBM is without current software revenue. In fact, Input, a Mountain View, Calif., research firm, estimates that in 1986, IBM grabbed \$2.9 billion out of a total U.S. software market of \$15 billion. In the same year, Input estimates that IBM did \$5 billion worth of software business worldwide, a figure that represents 10% of IBM's total 1986 revenue.

Almost all of IBM's software revenue comes from sales of operating systems, compilers and a host of software utilities — not from software applications. IBM, however, aims to make a big splash in the software applications market with ASD.

## Where the bucks are

"The creation of ASD shows that IBM is committed to software, and it indicates that IBM thinks that software is a high growth and profit area," says Mike Cohen, a program manager at Input.

The main catalyst that ASD intends to use is IBM's Systems Application Architecture (SAA), a common set of application design protocols and standards that the company says will eventually result in common application interfaces across its Personal System/2, System/36 and 38 and 370 product lines.

According to Joseph M. Guglielmi, an IBM vice-president and president of ASD, IBM and third-party software developers will use SAA as a tool to produce and tar-

get new applications toward selected vertical corporate markets.

ASD will not be responsible, however, for operating systems or other operating environments such as DB2, IBM's relational data base management system, an IBM spokesman claims. ASD's operating purview will instead cover straight applications software, which includes such IBM products as the Distributed Office Support System, Displaywrite and Mapics, on a worldwide basis.

Although Guglielmi and ASD have been given global responsibility for application development, they will not necessarily be marketing the products.

IBM Japan, for example, will market ASD products in Japan, but it will also handle some of the application development because of its extensive research facilities. An IBM spokesman adds that some other IBM regional operations could strike the same kind of arrangement.

Unlike IBM, not many companies are able to divert internal resources to create a huge division like ASD. Some people, however, are skeptical that IBM, still so driven by hardware and hardware marketing, can put all the pieces together to produce quality software applications.

"IBM will have to figure out how to sell software," explains John Imlay, chairman and chief executive officer of Management Science America, Inc., an Atlanta software developer that has provided third-party applications for IBM mainframe customers for several years. "Its mentality is so hardware based."

Imlay says that IBM's venture into the software applications business puts pressure on all third-party software vendors. But there is a trade-off.

"The bad news is that IBM is in the

## SOFTWARE

## NEWS &amp; ANALYSIS

## dB

By Rich Tennant



business," Imlay says. "The good news is that it seems to be recognizing the importance of third-party vendors to the success of ASD."

Imlay also reasons that the global aspect of ASD will play an increasingly important role in its strategy to succeed.

"In the U.S., 75% of the mainframes run applications packages," Imlay explains, "but around the world, only 10% of mainframes use packages. That's a big, waiting market."

Dennis B. Farley, president of Indianapolis-based Development Center Insti-

tute, Inc., a forum for firms to share information, says IBM will have a lot of questions to answer about ASD and SAA in the months ahead.

"I want to know more about its new products, how they will fit with its existing products, and I want to know about [product] time frames," Farley says. "IBM hasn't given me any answers yet."

In the end, Imlay says that IBM will succeed with ASD. "It won't be overnight," he explains, "but if they use independent software vendors to help them, they'll do it." —SK

# Why buy? Market shift makes software leasing attractive

MIS departments are increasingly turning to leasing agreements to finance major software purchases. This is a radical change in the way both MIS and financial people regard software and shows a fundamental shift in value away from hardware.

Traditionally, companies have leased or leased-to-own hardware, while they purchased software outright. This situation reflected the fact that hardware was far more expensive than software. Indeed, most financing organizations regarded software as an intangible asset, that is, something worth no more than the disk or tape on which it was written. Finance firms, therefore, refused to touch it.

But in recent years, this perception has changed. Hardware

has become increasingly inexpensive, while software has grown more complex, sophisticated and costly. The crossover became official in 1986 when none other than IBM announced it would be relying less on hardware leases for its income and more on its operating systems and applications.

A number of financing organizations have already begun to offer leasing and similar arrangements for software. Typically, the finance company contacts the software vendor and offers its services. The vendor will then offer its customers a time payment or lease program method of purchase.

When a user makes a purchase under the program, the finance company sends a check to

the vendor for the total cost of the software plus, sometimes, a commission. The financier then becomes the owner of the software and leases it back to users for relatively low, regular payments. At the end of a set period, the user usually either gains title to the software or has an option to buy it.

The advantages of this setup are that it allows the vendor to get the price of the software in a lump sum and allows the buyer to spread payments over a long period. The finance company makes a profit in the form of standard interest fees.

Finance organizations getting into software leasing are a disparate group, united mostly by a common awareness of the increasing value of software. One such company is Studebaker-Worthington Leasing Corp. in Jericho, N.Y. Studebaker-Worthington claims that its Leaseoff program was the first 100% software leasing program available in the U.S. Currently, Leaseoff covers software sales of

\$1,000 and up, with terms of up to 60 months. The firm further sweetens the deal for vendors by offering commissions of up to 5% of the purchase cost.

Another early pioneer in software financing is Software Funding International, Inc. in Deerfield, Ill. Software Funding's main customers are Fortune 5,000 companies that want to maintain a large software library and still conserve working capital. Typically, Software Funding operates lease arrangements under which the buyer leases software for up to 66 months and then has the option to buy outright at a nominal fee.

Software Funding's client recently increased dramatically. Last May, Eden Prairie, Minn.-based Dataserve purchased a large but noncontrolling interest in Lue company, Dataserve, in turn, is part of the very aggressive regional Bell holding company, BellSouth Corp. in Atlanta.

Meanwhile, other high-tech financing firms are getting into the software leasing business.

Phoenix American, Inc., located in San Rafael, Calif., for example, is well known as a hardware leasing operation. However, its Micro Systems Leasing group has recently branched into software-only financing. By early 1988, the group could claim a significant presence among value-added resellers.

The long-term consequences of this kind of financing for the industry as a whole is to further shift MIS officers' concerns and resources to software at the expense of hardware. But another shift could follow — perhaps away from both hardware and software and to services.

A hint of that trend may have recently come from San Francisco-based Online Business Systems, Inc. Last May, Online announced that it had formed a new subsidiary, OBS Ventures. OBS will supply promising but cash-poor young companies with IBM mainframe DP services in return for equity. In effect, then, OBS is a venture capital firm that has no capital. —MT

# Back to basics: First there was RISC, now there's WISC

Technology enables developers to work in chip's microcode

First it was reduced instruction set computing (RISC). Now, with a new technology and a new acronym, a high-tech start-up company, Torrance, Calif.-based International Meta Systems, Inc., has announced writable instruction set computing (WISC), a technology that reportedly allows software developers to work directly in the microcode of a processor chip.

Every microprocessor has a certain amount of operating software built directly into the chip's read-only memory (ROM) as firmware. These "micro instructions" are in microcode, and the business of writing them can be extraordinarily complex. Programmers who work in microcode are among the industry elite—they are usually employed only by chip vendors.

Recently, some of the most important computer design work has been done at the microcode level. Many of the performance advantages of RISC "hardware" architectures, for instance, derive from improved micro instructions. The whole idea of reduced instruction technology is to keep the microcode to a minimum so

that it will execute more quickly, which is exactly the same reason that programmers have tried to keep high-level code as small as possible.

## Unwilling and unable

Because microcode is so difficult to write and because it is usually in unalterable firmware, most software developers have been both unable and unwilling to get involved with it.

International Meta Systems, however, has set out to change that state of affairs. The company has developed a microprocessor chip whose microcode can be altered to fit specific applications. The chip, which has been placed in the company's Max 2 coprocessor board for the IBM Personal Computer AT and compatibles, has its microcode in random-access memory rather than ROM. Micro instructions can be thus rolled in and out of the chip as though they were any other kind of software.

Moreover, the vendor has developed what it says is a modified microcode that is vastly easier to write. Company officials claim that this microcode is about as diffi-

cult to produce as assembly language, and although assembly language can be brutally difficult, it is much simpler than traditional microcode.

Developers writing for the Max 2 could, then, put the most frequently used routines of their software directly in microcode, in which it would execute much faster.

According to International Meta President George Smith, "In any intensive operation, 90% of the time you're executing only 10% of the code. With WISC, you could put that 10% directly into microcode."

In addition, because the microcode is so controllable, WISC machines could boast extremely powerful compilers. Developers could specify a nearly one-to-one correspondence between higher-level languages, like Cobol or C, and machine code.

International Meta is a small, privately funded start-up of approximately 17 people. The principals include Smith, Arthur E. Speckhard and Joseph M. Thames—all formerly with the federally funded research and development operation, The Aerospace Corp. in El Segundo, Calif. It was at Aerospace that WISC systems were originally developed as large experimental systems.

Smith, Speckhard and Thames decided to commercialize the technology and licensed it from Aerospace, which is forbidden by its charter from competing with private business. They founded International Meta in 1985. By 1986, the company had shrunk the device down to a single chip and had embedded it into a working single-board computer, the Metaframe, which was also a PC AT coprocessor. The Max 2 is essentially an upgrade of the Metaframe, and company officers say the

product will be their first important commercial offering.

In addition to WISC, the Max 2 is said to offer a number of advantages over traditional microprocessors. The company says it can, for instance, execute two micro instructions at a time, rather than only one, which is all that most conventional machines can manage.

Company officers say they are currently at work on a project for NCR Corp., which wants to use WISC coprocessors in its point-of-sale systems. In effect, NCR is said to be building an intelligent cash register that would be able to advise clerks and customers with on-board expert systems.

The long-term effects of WISC remain, of course, unclear. But in some ways, the technology completes the back-to-basics movement in microcomputing that RISC began.

## Return to earlier days

RISC lead the turn away from complex instruction set computing and toward the compact but efficient firmware of early processors.

Now WISC is attempting to take microprocessors back to the earliest days of computing, when all coding was effectively microcoding.

However, some industry observers say that this movement should not be regarded as regression. The great advantage of microprocessors is that they can be mass-produced. Their disadvantage is the inflexibility that mass-production incurs.

Movements like RISC and, if it catches on, WISC, reflect improvements in processor fabrication and programming that allow chips to be both mass-produced and flexible. —MT

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# THE ANALYST WHO KNEW TOO MUCH.

Advertisement by E. L. Lippman



What drove this man to build a spreadsheet 1,000 lines deep?

**R**ecently, a financial software ad appeared in the Wall Street Journal under the headline: "When I told my friends about this ad they said, don't do it, Bob." It featured C. Robert Tully, for 15 years a vice president and chief financial officer of the \$3 billion Celanese Corporation, and it caused quite a stir.

We can still send you a copy of that ad if you missed it. (Just give us a call.) But today we'd like to share with you the story of a Fortune 500 company that uses the product Mr. Tully risked his reputation over.

It is a story well worth reading. It will help you answer questions your CFO will probably ask you. It could help you save your company money. And it could help you rescue your company—like the MIS executive below did for his—from "the analyst who knew too much."

You will also learn about a new advanced financial software product called FASTAR, which was developed by Corporate Class Software, a subsidiary founded by the \$3 billion Celanese Corporation.

Here's what happened.

The vice president of finance for a \$2 billion-plus manufacturing company was worried. He had learned one of his analysts had created a monster spreadsheet 1,000 lines deep, and growing deeper by the day.

Could that be the reason for the slow analysis in his department, he wondered? Every request seemed to stall. An ad hoc request for year-to-year cost comparisons took a full day. A day! By then decisions had already been made and other problems needed attention.

What would happen if the company added a new division, he asked? Or assigned more product lines to an analyst? How much time would be lost?

## TRouble, TRouble, TRouble.

A call to MIS was sent out for help.

The MIS chief had been around long enough to know that the monster spreadsheet was just the tip of the iceberg.

Like most companies, financial data was spread out among the divisions of the corporation. And different departments used different formats to store the data.

As a result, analysts had a difficult time accessing needed data quickly.

To make matters worse, financial analysts had created their own data empires on PCs, and many had built elaborate and shaky programs with macros. (Though some so huge as the 1,000-line monster. "It was hideous," said one programmer who saw it.)

What would you have done in the MIS executive's position?

As one observer put it: "They saw that they were heading down a tunnel."

## A DRAMATIC DISCOVERY.

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FASTAR is not a tool. It's a ready-made solution for advanced financial applications, including financial consolidation and management reporting.

As a result, analysts can report more quickly, consolidate more accurately, and analyze more frequently than with conventional systems.

Another company found, for example, that year-end reports that used to

be available in early April, just prior to the annual meeting with shareholders, were now ready in February. And consolidations that used to take two to three days now took hours—with more accurate content. (One way that we've made consolidations more accurate is through a rigorous system of data checks that automatically checks data integrity.)

## BUILDING THE NUMBERS BACK WHERE THEY BELONG.

FASTAR also addresses the critical issue of data integrity and control.

Because FASTAR takes all programming off the spreadsheet, there are no undocumented programs to cause costly mistakes. (Think about the 1,000 line spreadsheet written by the analyst who



FASTAR is the packaged solution to advanced financial applications that can provide quantitative and qualitative improvements in your company's financial analysis.

knew too much. He was only looking for a way to speed his analysis.)

FASTAR also eliminates the need for passing data back and forth on pieces of paper and having secretaries or analysts type them into spreadsheets. This reduces the number of potentially dangerous errors that can occur. And because all financial information is stored in FASTAR's data base, MIS executives regain control of critical data.

You also protect all of your company's investments. FASTAR accepts data from fourth generation language products and database management systems, as well as microcomputer applications. (None of the companies using FASTAR needed more than three days to adapt the program to their corporate needs.)

In the final analysis, MIS executives show themselves to be strategic thinkers by giving analysts a tool to be more productive. (Did you know that one company found that 85 percent of an analyst's time is spent just looking for data?)

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## Update

Continued from page 7

for software developers. One is a technical dictionary that translates Microsoft Windows directives into an IBM Presentation Manager equivalent, including some added references and directions for producing Presenta-

tion Manager graphical interface applications. Another key addition for developers is what Microsoft is terming significant amounts of usable sample code.

In the meantime, IBM has announced December 1987 as the month that it ships OS/2 Standard Edition 1.0, months before its initial date of first-quarter 1988. Given the number

of OS/2 alternative operating systems now on the market and the growing user frustration at the long OS/2 wait, IBM probably felt it could not afford to delay the basic version of OS/2 and to begin the strategic and gradual migration of its user base to the Personal System/2 line.

IBM showed some software running under OS/2 at Comdex/

Fall '87, and at that time, IBM also indicated that more software will be available for OS/2 at its December release. Chances are that the software is not anything spectacular, however, and analysts are saying it will be several months after OS/2's appearance before truly innovative software running under OS/2, especially under the

Presentation Manager, will appear.

"Software has reached a stage now where the user interface is becoming very important," says George Morrow, chief scientist at DSC Nestar Systems, Inc., in Mountain View, Calif. But IBM also announced that the Presentation Manager will not appear until October 1988. That makes Microsoft's OS/2 Developers Kit updates crucial, because such updates are aimed at speeding the development of third-party software applications for OS/2, including the Presentation Manager. If the Presentation Manager is one of the big litmus tests for the success of OS/2 and the OS/2 line, then IBM will keep the pressure high to make sure applications are available when the Presentation Manager finally makes its appearance next year.

## Study finds MIS key in PC decision making, buying

For those who thought that MIS was fading out of the personal computer scene, think again. A recent corporate survey commissioned by research firm International Data Corp. in Framingham, Mass., indicates that MIS is very much in the driver's seat at most U.S. firms when it comes to the decision-making process and purchasing plans of PC software and hardware. The more things change... — SK

## Directory

Continued from page 7

clear idea of what is actually in the government's collection.

Source Translation has set about the task of getting, if not exactly a clear idea of that collection, then at least a slightly less murky one. The company's president, Gregory Alarmonian, says he spent the last "three or four years playing detective" at government and military installations around the country. The result was the first edition of the source code directory.

Alarmonian notes that "the applications include everything in the universe." For example, in the directory's table of contents there are entries for accounting, banking, insurance, business administration, business management, manufacturing, office automation and econometrics.

The directory lists the most useful titles Alarmonian could find; however, he says, there are at least 14,000 other titles within government files. — MT

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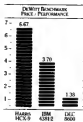
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News section written by Computerworld Focus staff members Stan Kolodziej, Michael Tucker and Rebecca Hurt.

# Expert systems enrich financial field

BY ANNE LOVETT

**T**he artificial intelligence industry has the reputation of being technology driven, striving to produce technologically eloquent products instead of working to meet users' needs. Expert systems applications traditionally have focused on the sciences, such as medicine, geology and computer sciences. However, users' increased interest in this area and vendors' search for new markets have caused the AI industry to begin to shift away from purely scientific expert systems software running on expensive, dedicated superminicomputers to a variety of applications packages and shells running on every class of

machine, including personal computers. And one industry — financial services — is emerging as the next significant user of expert systems.

Inherently, the nature of the financial services business and the suitability of certain mainstream applications draw this industry to expert systems because the financial field deals with a high volume of important transactions that involve judgment. For instance, the insurance sector does a great deal of underwriting; brokerage firms give a lot of investment advice; and banking and credit card organizations perform many credit analyses.

One insurance company agrees that expert systems are well-suited for its work. According to Mike Golbersuch, an information systems consultant with Liberty Mutual Insurance Co. in Boston, "It's in the nature of our company — we're a decision-making factory. Expert systems are expensive to develop, [so] it's best if they can be applied frequently, in a repetitive way. An expert system is a promising tool to make better decisions more quickly."

Suitable applications for expert systems are said to be those that are critical to a company's core business because it is there that the big-gest payoff lies.

Expert systems applications should be used in the following areas:

- As the mainline to a company's business.
- Where functions are performed by many people with different levels of expertise.
- Where a higher level of expertise is desired without the expense of hiring more experts.

Lovett is a principal of *Arenas Associates*, a Boston-based marketing consulting firm specializing in the high-technology and financial services markets.

- Where there is a scarcity of top experts.
- Where there is a need for a training tool to make information accessible to less informed, newer employees.

Renée Baring, project director for applied AI at The Equitable Financial Cos. in New York, sees the "use of expert systems as a bottom-line issue, addressing business needs where it is not practical to solve a problem with existing technologies. Expert systems work particularly well for unstructured types of problems."

Even though the financial services industry is a natural forum for expert systems and a variety of specialized expert system products are currently available, such as Sunnyvale, Calif.-based Syntelligence, Inc.'s *Lending Advisor* for the banking industry and *Underwriting Advisor* for the insurance business, financial services companies aren't knocking down doors to buy expert systems products. In fact, the financial services industry is proceeding cautiously, with only a few companies running production-level expert systems. Many other firms are testing products in their research and development departments in order to stay informed and be ready to implement an expert system when the time is right for them.

One financial services leader in expert systems implementation is New York-based American Express Co. According to Ted Markowitz, director of technology strategy at Amex, the company began its involvement with its current AI expert system approximately 2½ years ago. The company chose to implement an expert system in its credit authorization function because this area has the right qualifications for expert systems success. First, credit authoriza-



tion is a critical area to the company's business. Second, this area handles a large volume of transactions. Third, the area has well-understood problems. And, finally, this area has a large training manual. The credit card business makes money by approving good credit risks; therefore, a method to fine-tune the selection process produces many rewards.

In the U.S., the vast majority of Amex's authorizations are approved electronically, but the company emphasizes that customers never have been and never will be denied credit by a machine. Those not approved automatically are referred to one of 300 credit authorization employees.

To approve or deny credit, the authorizer

reviews up to 16 screens of data as well as credit bureau information.

The expert system currently in use at Amex is a customized one called the Authorizer's Assistant (AA), which was designed to help the authorizer filter through credit data. AA shows the authorizer the reformatting data, makes a recommendation to approve or deny credit and explains its line of reasoning. However, the authorizer makes the final decision on whether to approve credit.

At Amex, AA uses IBM hosts and Symbolics, Inc. machines for development and processing and Sun Microsystems, Inc. machines for protocol conversion and message switching. Los Angeles-based Inference Corp. provides the software,

which has been customized for Amex.

Amex says there are three primary benefits derived from the AA system, as follows:

- Productivity and time savings. Amex says it expects a 20% reduction in time needed for a credit review. AA will reportedly handle 20% to 35% of current traffic and has had a 96.5% accuracy rate to date, a figure that reflects the percentage of time needed for authorization employees to concur with the system's findings. The company says it anticipates a 45% to 67% internal rate of return on its investment in the AA system.
- Loss avoidance. The company says it expects to reduce losses associated with bad credit risks by improving the screen-

ing process. Better screening will not let bad risks through, while it will allow more good risks to be approved than is possible using traditional methods.

American Express says it expects the rate of credit denials to decrease by one-third and its 90-day collection cases to be reduced by 50%. Overall, the company says, loss-avoidance savings will be five times greater than cost savings.

• Customer service benefits. These benefits are much more difficult to measure, but a higher percentage of quicker approvals will most likely increase customer satisfaction.

Authorizer's Assistant has been a success so far at American Express, and company management has reportedly approved several other AI-related systems. However, the company will not disclose the areas in which it intends to implement expert systems next.

#### A more typical user

While American Express is on the leading edge of AI and expert systems use, Equitable is a more typical financial services user of AI.

Equitable's R&D department began its AI involvement using Symbolics hardware and Arthur D. Little, Inc. expertise to develop customized software. Equitable says its R&D department's objective is to keep track of new developments and to fund AI and expert system experiments in conjunction with business users. At the appropriate time, independent business units will take over certain projects, with the R&D department helping with technology transfer and, hopefully, saving time and money for the business units.

Equitable has created two model expert systems: one for the internal auditing department and one for the underwriting department. The auditing expert system, developed on Symbolics and Texas Instruments, Inc. computers and ported to an IBM Personal Computer AT, is used primarily for audit scheduling and to spread out the expertise of the more experienced individuals in the department.

For the underwriting expert system, the R&D department worked with the New Business Group at Equitable to produce a demonstration model that evaluates the underwriting risk of someone who might have a history of alcohol abuse. Using information obtained from employers, doctors and so on, the system helps identify high-risk individuals by reading between the lines.

The firm claims it has made great progress in approaching and solving the problem of identifying high-risk candidates, but it is not certain whether it will develop a production system for everyday use.

However, the R&D model is generic enough that, with different rules, it can be applied to other underwriting problems.

According to Dolores Bailey, vice-president of R&D at Equitable, the creation of the underwriting expert system had some interesting side benefits, particularly in the compilation of rules. In the course of having information and expertise extracted from them, the underwriting experts began to crystallize their own thinking. They realized that the way they operated was not always in sync with the underwriting manual and that they needed to update it.

Furthermore, the expert underwriters argued among themselves about various approaches to different problems and concluded that "if we don't agree, how can we expect others to implement the rules? Let's figure out how to impart information clearly." Ironically in this case, an expert system — designed to help those who are not experts — stimulated and helped the experts themselves to clarify their thinking.

#### Still a technical stronghold

But not all financial services companies have expert systems supplementing or replacing the work of professionals. Jim Stoddard, vice-president of information technologies at Boston-based Fidelity Investments, says that at his company, expert systems are found more in technical areas, such as telephone networks and problem determination analysis, than in investment areas.

He says there are three reasons that Fidelity's system works in technical areas: Fidelity is not a full-service broker and, therefore, has more self-directed investors; Fidelity is reportedly a leaner company than most of its competitors and is, therefore, less likely to invest a great deal of money in AI technology right now; and Fidelity believes expert systems don't have the "intelligence" in the same sense as a high-level professional does.

According to Stoddard, "Expert systems can make generalized recommendations based on facts about a person's financial status, but it is tough to determine the timing of putting money in or out of investments. It takes assimilation, knowing the business and subtleties. An expert system can build models, but Fidelity's investment strategy is fundamentalist — know the company, don't just be electrocuted driven with lots of indices. That's not our style."

Stoddard says he feels that "AI companies have been shooting at the wrong target. We don't want to replace our fund managers; we want to help our 2,000 to 3,000 telephone operators. I won't get excited about AI until it sits in the background to assist when a telephone operator's conversation with an investor shatters from account information to questions

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about investments."

And AI vendors are beginning to take user advice to heart. These vendors, long awaiting their predicted spectacular successes, are using a new method to bring potential users and their dollars into the AI camp—consortia.

Many groups are springing up, such as Waltham, Mass.-based Artificial Intelligence Corp.'s Knowledge-Based Management System Consortium, in which user companies pay an undivided amount of money to fund the development of an expert system shell for IBM mainframes; an independent development partnership between Syntelligence and several banks and insurance companies; and an investment-based involvement of several companies with Teknowledge, Inc. in Palo Alto, Calif., with the agreement that Teknowledge will not sell to the companies' competitors.

Liberty Mutual in Boston is part of the Knowledge-Based Management System Consortium. Expert systems use at the company is now applied R&D, concentrating on applications in the area of underwriting. Goldersbach explains Liberty's involvement with a consortium as

**AI vendors now are recognizing that while initial sales are typically to R&D departments, the bigger sales potentially are to the traditional data processing departments.**

stemming from the desire to be involved in the formation of the ultimate product.

"Everyone in the insurance industry is trying to learn more about AI and how to maintain and integrate it. The applications we are working on are prototypes, proofs of concepts. We need tangible feedback from potential users in order to build good production systems. We need to show the user community what expert systems can do," he explains.

Other users disagree with the vendor-oriented consortium concept, however, and wonder why they have to pay the vendor to fund development for a commercial product that will, in most cases, be available to their competitors. Amer's Markowitz sees both advantages and disadvantages with vendor-oriented consortia. Advantages include having early delivery of a product, perhaps even with a decrease in price. But he views the disadvantages as being potentially greater, including the risk of "putting all your eggs in one basket" and compromising by sharing with competitors.

Bailey of The Equitable views her company's decision not to join a consortium as one based on corporate culture. "Equitable managers are not interested [in the consortium concept], believing we are unique, that we'll do it ourselves. The corporate culture is not open to such an arrangement. We prefer information exchange groups."

Instead of joining a vendor-organized consortium, some New York-area financial services companies have banded together to form a user consortium called Smart-FS Group. Nine companies form the acting executive committee: Amer-

ican Express; Equitable; The Prudential Insurance Co. of America; Metropolitan Life & Affiliated Co.; Chemical Bank; The Chase Manhattan Bank; J.P. Morgan Co.; Drexel Burnham Lambert, Inc.; and Securities Industry Automation Co. Amer's Markowitz is chairman of the committee. He anticipates that eventually executive committee membership will expand beyond the Northeast.

Smart-FS Group drew up a charter and had its first meeting last September, with more than 200 people from the financial services community attending. Meeting every other month, Smart-FS Group seeks to share information internally and to foster AI use in the financial services industry. The participants, tired of vendor presentations and seminars, say they would like to act as a unified voice to vendors, getting them to focus on the particular problems in the financial services industry. With such an impressive lineup of financial services companies on the executive committee, Smart-FS Group should have no problem getting the attention of vendors and influencing product development plans.

Financial services users view the current situation for expert systems implementation as restrictive. Expert systems require special equipment and people with unique training and offer only primitive development and delivery mechanisms in a resource-intensive manner, they say.

To become a widespread success in the financial services industry, expert systems must be brought into the mainstream of the corporate computing world with solid integration into IBM systems being the key to success. Users want to be able to call expert system programs effortlessly from traditional transaction processing systems. Fidelity's Stoddard agrees that integration into IBM systems is crucial, but says, partly because he will not buy stand-alone machines and partly because he cannot imagine a professional consciously running AI functions. Instead, he says, these functions must be in the background.

Stoddard explains that current vendors have a different view. "These vendors see AI as a discrete function, with someone cranking through models, producing answers to a business problem."

Markowitz sees the current configuration situation as temporary. "Our connectivity solution now is not optimal. We would like to see IBM take a stronger role and provide the level of communications that we have gone to outside vendors for."

But he disagrees with other users' pervasive IBM-only attitude and decision to postpone implementation of an expert system until IBM compatibility is assured. While it is more work to deal with multiple vendors, for American Express, the current benefits of using Sun, Symbolics and IBM outweigh the disadvantages of a multi-vendor environment, he claims.

In the past, vendors placed more emphasis on AI functionality than on broad applications. AI vendors now are recognizing that while initial sales are typically to R&D departments, the bigger sales potentially are to the traditional data processing departments. This fact, coupled with user concerns about AI's lack of integration with installed systems and the threat of Big Blue, has forced vendors to pay more attention to traditional DP issues and interfaces and to promote a more

bottom-line orientation.

There is little dispute among users about IBM's dominance in the financial services industry, but there are many questions about IBM's future role in expert systems and, accordingly, the fate of the small AI vendors.

#### A stopgap move

Users concur that IBM's current offering, the Expert Systems Environment, or ESV, is a stopgap at best. In its defense, IBM has not seen the need to provide great expert systems software to unwilling users; now that more and more users are indicating a real interest in the capabilities of expert systems, IBM reportedly is preparing to offer a better product.

Equitable's Barling predicts there will be a new IBM offering within a year. At that point, LISP vendors will have an even tougher time convincing the market to run LISP hardware for anything other than development. Barling, however,

does not necessarily see an all-IBM hardware environment for expert systems, adding that Apple Computer, Inc. "may be a contender for delivery of expert systems if the machines can communicate well with IBM."

Users vary in their predictions of exactly when expert systems will catch on in the financial services industry, but most say that use of the technology will accelerate dramatically in two to four years.

Equitable's Bailey claims that the proliferation of parallel computing will help expert systems hook into data bases. She further predicts that software developers will integrate expertise into their own software. According to Bailey, "Almost any vendor with any vision is implementing computer-aided software engineering applications of expert systems technology embedded in the software. Corporations will build the expert modules. By 1991, we will see a rich set of software packages available."

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Circle Reader Service Number 14





# Systems renovation

*Save money and hassles:  
Rebuild rather than buy*

BY CONNIE MCCANDLESS

**R**enovation, renewal, re-engineering — whatever the term — redoing old information systems can be a viable, inexpensive alternative to building a system from the ground up.

Most current application systems weren't built for flexibility. These systems are showing their age as a result of 10 to 20 years of patching old functions and tacking on new ones. These old-timers, in many instances, cannot keep up

with the rapid changes happening all around them. But what can companies do to update the monolithic systems that currently support their business operations and administrative functions?

The obvious and expensive answer is to throw the systems out and start over using a new data base management system and a higher level language. The less obvious, and often less expensive, answer is to renovate old systems. This solution is less obvious because of the industry's lack of experience with this approach and because of misguided attitudes about old systems. Renovating old systems may be less expensive as well, because more than half of the old functions can often be salvaged.

System renovation normally includes a massive cleanup operation as well as functional and technical improvements. Yet even though current systems, which, according to the U.S. General Accounting Office, consist of more than 105 billion lines of code worldwide, are old and in poor condition, they are gold mines of detail about business operations. In the past two to three years, automated tools have become available for analyzing and unsmearing Cobol systems. These tools have opened up the renovation opportunity for more than an estimated 75% of all Cobol-written systems — an opportunity that previously was feasible only for a small percentage of well-structured

and documented systems.

Although awareness of the renovation approach has been gradually increasing because of publicity surrounding new restructuring tools, attitudes still get in the way. Systems staff, users and senior management have preconceived ideas about current application systems. But whether they love or hate the current systems, they want to keep them as is or throw them away, not renovate them.

The systems staff's negative attitude toward renovation comes from the pride of ownership and the fear that old systems will break if anything is done to them. Proposing a renovation rather than reconstruction may meet with numerous objections and skepticism because individual programs and systems have personalities and reputations in MIS; there is a certain folklore associated with these old systems. Senior technical staff and managers may have written or modified these systems early in their careers and may be the only resident gurus who understand the structure and tricks of the system.

Users' bad attitudes toward renovation stem from the comfort of knowing how the current system works and the frustration that change is both costly and slow. After all, most users care more about what a system does than how it is implemented. However, after weathering years of using the system and requesting changes to it, users may have a credibility problem with renovation. They may wonder how MIS can make massive changes to the system when they have told users for years that even a small change takes months to implement.

Senior management may either take the system

McCandless is a manager in the Toronto office of the Post Marwick Consulting Group. She assists information systems managers in improving the effectiveness of their services and organizations. Jim Peterson, senior consultant in Post Marwick's Catalyst Group in Chicago, contributed to this article.

for granted or view it as a costly impediment to change. When an executive decides to replace a system, he seldom considers how to do it — that choice is up to MIS.

In a classic feasibility study, a systems analyst evaluates whether to make, buy or do nothing with an information system. When evaluating an existing system, whether to renovate is another option that should be added to the list.

Like other investment decisions, the decision to renovate should be based on business factors: MIS must review the current system, assess user requirements, analyze the benefits and costs of various options and develop a workable system evolution strategy.

#### Taking stock

When reviewing the current system, begin your analysis by taking stock: itemize the source and copy code, the program and system documentation, the hardware and software requirements for the system, test procedures, the outstanding change requests and any known technical problems. Depending on your standards and practices, this information may be readily at hand or may require time-consuming data gathering.

Assess the quality of the code, documentation and testing environment. For the code, review the structure, complexity and names. For the documentation, review the currency, completeness, level of detail, maintainability and standards conformance. For the test environment, review the currency, coverage in terms of functions and test cases and ease of

use and maintenance.

There are three approaches that can be used to review the code in the system — a survey of maintenance staff, a manual review of selected or random code samples and an automated review using a code analysis tool. A combination of these methods is the most effective.

The maintenance staff can usually point to the line number and module that would be found in an automated review. However, performing an automated review is more objective, systematic and will produce documentation that is useful in later stages of the renovation process. Some of the analysis tools on the market are Inspector from Salem, Mass.-based Language Technology, Inc., Pathway from Chicago-based Post Marwick Catalyst Group and Scan 370 from Washington, D.C.-based Group Operations, Inc.

Next, prepare a high-level description of the functions and data within the existing system to provide a baseline for comparison with user requirements.

In assessing user requirements in a system renovation, it helps to think of your existing system as an application package and as a prototype when reviewing user requirements. Envisioning the system as an application package lets you step back from the details of the system and organize it in functional and physical terms; encourage cost and functionality trade-offs that are inherent in a package selection; and keep the requirements at a high level. It also enables you to provide a concrete reference point for discussions with users.

MIS should review existing change requests during this step

to see if any are on a date. There also may be some overlap among old requests and new ideas that emerge during requirements discussions. Remember, old change requests may have been constrained by what users thought were reasonable requests to make.

Functional requirements like those listed above are not the only issues when considering system renovation; in most cases, companies may also want to change the technical operating environment for the system.

Many existing systems predate the organization's current technology. One of the main reasons for renovating the system may be to take advantage of on-line, data base technology or to convert to new hardware, a new operating system or the most recent language upgrade.

For renovations to be cost-effective, there should be a good functional match of at least 65% to 85% between the current system and user requirements. The system should also be well structured, either originally or

who have used this type of tool.

There are other factors besides costs that should be considered when assessing whether to renovate. Issues such as risk, time constraints and staff availability are also important. Even though the concept of renovation may be new to your organization, it still may represent a lower risk than a major systems development because it is an evolutionary approach based on incremental change from a known base.

After determining user requirements and assessing the feasibility of the various implementation options for a new system version, the system renovation should proceed according to an appropriate system evolution strategy. This strategy is critical to the project's ultimate success. It specifies a series of manageable changes, set up according to business and technical priorities, that take staffing, budget and time constraints into account.

A renovation strategy should incorporate four types of changes into the system:

**There are other factors besides costs that should be considered when assessing whether to renovate.**

**Issues such as risk, time constraints and staff availability are also important.**

through restructuring.

It is not easy to assess the costs of renovating a system. The normal rules of thumb about development and maintenance do not apply. For systems development, writing new code is only a small part of the job; development also includes a large effort of gathering, verifying and communicating detailed functional specifications. The renovation process is salvaging not just old code but also a large part of the specification effort that is behind that code.

Likewise, maintenance changes on old, poorly structured, overly complicated systems may require more effort than rewriting the function from scratch. You may not want to tackle renovation on those terms. The renovation process was designed to eliminate the mind-bending analysis of current code. Testing, a big issue in development and maintenance, is no less of an issue in systems renovation.

To develop informed cost estimates, you need to know how the transformation would be done and have some experience with the process. Look for people in your firm who have experience working with significant changes to existing systems — conversions, major releases for existing systems or customized application packages. If you are planning to use restructuring tools for the first time, consult people in other organizations

changes to stabilize the system, changes to improve the quality of the current system, technical enhancements and functional enhancements.

The first step in the renovation process, stabilizing the system, establishes a solid basis for change. At this point, the system is restructured, if necessary, using a Cobol restructuring tool, such as Structured Retrofit from the Post Marwick Catalyst Group, Recorder from Language Technology, Cobol/SF from IBM or Superstructure from Group Operations.

In addition, this step establishes project management, change control, testing and quality assurance processes to support the system's multistage evolution. The stabilized version of the system is then tested and implemented as the first release of the emerging system.

During the second phase, system improvements, the quality of the system is upgraded without changing its functionality. This may include splitting overly large programs, improving performance, renaming data elements and upgrading to a newer version of Cobol. The last two areas, technical and functional improvements, are then implemented as a series of releases with the changes in each release building upon the improvements found in previous releases.

As you can see, the renovation process is a massive change management exercise. Organi-

zations that already have a good change management process in place will be ahead of the game. Organizations that must develop these procedures will reap additional benefits from applying this process on an ongoing basis to all their systems.

System renovation is still too new a procedure to be a routine matter. Organizations usually only renovate when their backs are against the wall because the deadline is fast and there is not time to rebuild or because the systems staff that understands the current system has left the company.

What kinds of systems are being re-engineered? Typically, it is systems that are subject to frequent change motivated by customers, regulators, the parent company or a merger or acquisition.

One frequent target for renovation is the compensation system, because it must reflect changes in bonus and commission calculations and legislation. Another target area is a system, such as a revenue collection system, that is industry or company specific and that must reflect changes to the firm's product line. It is not surprising that the financial services industry, with its commitment to information systems, dynamic development of new products and constant stream of takeovers and mergers, is an early adopter of the renovation approach.

Those organizations that have the ability and the resources to manage change will successfully carry through a renovation project. Typically, these companies have large systems organizations and a large portfolio of application systems. They are open to trying new techniques and products, and they have the money to buy and implement these technologies. They have technology champions who understand and believe in the approach and work hard to make it successful.

#### Slow, steady growth

However, here-again information systems are still rare. Yet the penetration of re-engineering tools and methodologies will proceed steadily in firms that have millions of dollars invested in old systems, which must be updated to accommodate new business needs.

The avoidance of acceptance will probably not occur until the 1990s when the next generation of re-engineering tools makes renovating systems easier and even more cost-effective.

We will really begin mining the gold in our information systems once systems renovation is automatic — when we can extract the functional specifications that are embedded in our current systems and use them to generate new versions automatically. ♦

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# A little planning goes a long way

BY REBECCA HURST

**T**he Winter Olympics is a sight and sound spectacle that keeps millions of people all over the world interested for two weeks every four years. The Games come off so smoothly that the preparation that occurs years beforehand often goes undetected. But planning an extravaganza of this size is no mean feat, as *Computerworld Focus* discovered. Enter project management software.

You don't have to be planning the 1992 Olympics to need project management software.

Other users *Focus* spoke with have found innovative ways to automate their project planning, whatever its scale.

At the time when project management software resided primarily on mainframes and minicomputers, it was used almost exclusively by construction, utility, telephone and technical engineering firms. These organizations had large-scale projects that could justify the cost of the hardware and software needed to manage them, explains Mark Pine, a software analyst for International Data Corp. (IDC), a Framingham, Mass., research firm.

Since then, Pine says that the arrival of

personal computer-based packages has made the concept of project management appealing to a variety of businesses with smaller projects that do not need the resources of mainframes or minis.

While PC-based packages are still used for traditional projects such as high-tech engineering, other, "diverse uses for small-scale project management applications include managing farms or small businesses and creating trade show management or computerized executive relocation programs, to name a few. Disneyland International in Anaheim, Calif., even uses PC-based software to manage its operations in its engineering departments and corporate offices.

However, the availability of project management applications for the PC will not displace the need for minicomputer- and mainframe-based project management software, Pine predicts. In fact, many firms will outgrow PC-based project management systems as they acquire more people and as their projects require more steps, he says. "These companies will graduate to [programs run on] small minicomputers or multiuser micros."

The minicomputer may already have a great impact on the mainframe project management systems' viability, Pine suggests. "A lot of companies may find they don't need to spend money on a mainframe project management system," he says. "They will discover that their projects can be brought down to the mini." However, mainframes will continue to be used for global-scale projects, such as the designing of a mainframe system, which have a range of projects within them, Pine adds. Some firms even will augment their mainframes with PCs, using the micros to help control remote projects.

Each of these project management software users that recently spoke with *Focus* illustrates a different solution to project management needs.

The XV Olympic Winter Games Organizing Committee primarily uses a traditional mainframe for a nontraditional project. The Carolina Power & Light Co. utility uses a minicomputer as well as a mainframe for conventional utilities project management. And defense firm Loral Data Systems-Conic uses a PC to handle



GEORGE HILDER

## *Users praise project management tools*

high-tech engineering projects that many other companies historically have controlled on a mainframe. Together, these organizations represent some of the ways in which the uses of project management software are diversifying.

The XV Olympic Winter Games, to be held in February 1988 in Calgary, Alta., Canada, are a prime candidate for project management. In organizing the 16-day event, the Winter Games committee worked for more than five years to coordinate 120 competitive events and the activities of approximately 2,600 athletes, heads of state from 51 countries, more than 4,000 journalists, 9,000 Olympic volunteers and 1.6 million spectators. The fruits of the committee's labor will be viewed by an estimated worldwide television audience of 1.6 billion.

If the management of all these factors was viewed as a single task, a project manage-

schedule, not along conventional terms but along terms that work for users," Richards claims.

In choosing a project management system for the XV Olympic Winter Games, Richards had several requirements. First, the system had to be based on a mainframe to provide adequate storage and throughput. "A microcomputer can take care of

hundreds or even a few thousand activities, but a mainframe can handle 32,000 activities per network for an unlimited number of networks," he explains. "We have not stretched the capacity of our mainframe."

Second, processing speed is an important advantage that mainframes hold over micros, Richards says. "The turnaround

on a mainframe is a few minutes. It takes a lot longer on a micro."

Organizing the Olympic Games has put several stipulations on the project management software as well. One very important software function is flexibility in creating codes for each data element, Richards says. "We have to identify each of our 5,000 activities with a code that

identifies the venue, or Olympic site, sport and person responsible for a venue," he explains. Project/2 uses an alphanumeric coding capability. "By using alpha characters, we can cut the number of coding digits in half."

Another key feature is flexibility in customizing reports, Richards says. "If you can't get out a meaningful report that will



John Richards of the Winter Olympics

ment application would probably fail. Therefore, the event has been broken down into 5,000 activities, according to John Richards, supervisor of scheduling for the Winter Olympics. To organize these activities, Richards uses Project/2, a project management package for IBM 370s and compatibles from Project Software & Development, Inc. in Cambridge, Mass. Project/2 runs on one of five mainframes the Games committee uses.

While past Olympic Games have been similarly complex, the 1988 Winter Games will be the first to use a fully automated project management system, Richards says. The IVX Olympic Summer Games Committee in Los Angeles used Project/2 to develop a huge network (organizational chart) detailing the project, but when they applied the software's logic, it showed that the Games would be two years late, he recalls. "The committee retained the list of activities," he says, "but instead of finding out which ones could be done in parallel, the organizers manually put in dates for the activities that would meet their deadlines."

The problem was not the software, Richards maintains. "It depends on the individuals using the project management systems." One problem is that a traditional approach to project management does not always work, he says. "You need to prepare a

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make the manager happy, you haven't done your job."

For example, a network on Project/2 describes the projects at the Kenmore Nordic Center, an Olympic venue that encompasses cross-country skiing, the biathlon, the Nordic combined event and some skiing events for the disabled, he explains. "If the person in charge of cross-coun-

try skiing needs a report, he just wants the information that relates to cross-country skiing, not all the activities at Kenmore."

Additional capabilities that are vital in managing the Winter Olympics include handling large numbers of activities, applying resources to activities, tracking projects and resources and providing quality graphics presenta-

tions, Richards says.

Although the Olympic committee relies heavily on its mainframe system, Project Software & Development's Quiknet and Quiknet Professional PC-based project management products serve as adjunct systems. Working at home or in a remote office, Olympic committee members can put in data to create a basic

plan and then upload it to the mainframe, Richards says.

Together, Project Software & Development's products have saved time in recalculating project resources that previously were handled manually. "We can get an answer in one or two hours, depending on the complexity," Richards notes. As a result, "We're making more in-

formed decisions."

Like the Olympic committee, Carolina Power & Light, located in Raleigh, N.C., uses a mainframe for project management, but the utility also has three minis. Together, these machines help minimize utility plant outage times. Scheduled outages to refuel and maintain power plants can last from several hours to several months, explains Cathy Ward, principal information systems specialist at Carolina Power. As a result, she says, "We need to schedule as many activities in the shortest amount of time possible."

Like many utility companies, Carolina Power began with an IBM mainframe running IBM's Project Management System (PMS) IV. However, when the utility began looking at dedicated systems for each of its three nuclear plants, it decided on Hewlett-Packard Co.'s 1000 series minis running the Artemis project management package from

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Cathy Ward of Carolina Power & Light

Houston-based Metier Management Systems, Inc. because of the capability of the software. Ward recalls. Between 1980 and 1984, the firm installed three HP 1000s running Artemis.

Carolina Power has continued to use the mainframe-based project management system for its fossil plants, general office and transmission department. After IBM discontinued support for PMS IV, though, the utilities firm replaced the software with the mainframe version of Artemis, which runs on an IBM 3083 Model J.

Since then, Carolina Power has interfaced the minicomputer and mainframe versions of Artemis. "By interfacing the systems, we have saved a lot of time, eliminating the need to re-key data," Ward says.

As with the Olympic Games Committee, Carolina Power required a software package that handles a high capacity of activities, resources and calendars within a network. The utilities firm also shared the Games committee's need for strong graphics capabilities. "Seeing a diagram of the network is important for explaining the relationship between activities," Ward explains.

A relational data base management system was not a

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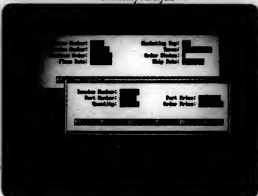
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## PROJECT MANAGEMENT PLANS

requirement for Carolina Power. However, the relational DBMS in Artemis has proven to be a very important tool, Ward notes. "Project management is not an exact science, and having a relational DBMS makes it easier for individual project managers to tailor the system to their needs," she explains.

#### "Ideal road map"

The use of Artemis also has probably shortened the length of planned outages at Carolina Power, Ward says. More directly, Artemis has made project plans clearer and more accessible to the company's employees. "The project management system is an ideal road map for showing where a project is going and the

resources needed to get there," she explains. "And it gives everyone involved in the project — not just the planner — a clear picture."

Along with utility companies, another traditional user of project management systems has been the high-tech industry. As a developer of state-of-the-art telemetric devices for airborne defense systems, Loral Data Systems-Conic in San Diego is one of a legion of high-tech firms using software to manage projects. However, while most of those firms have typically relied on mainframes and minis, Loral uses a personal computer.

#### Why?

Size. Loral-Conic is a subsidiary of Loral Corp., one of the largest defense elec-

tronic firms in the U.S., but Loral-Conic has only 40 design engineers — too few to justify a large computer. In fact, until recently, there were too few employees to justify a PC, according to Paul Brammer, Loral-Conic's engineering program administrator. "Prior to my joining Loral-Conic, project plans were being drawn up on the back of paper napkins, which could get thrown away and forgotten," he remarks, only half in jest.

But with the company growing 20% to 25% annually, projects were becoming too unwieldy to plan manually, Brammer says. In late 1986, the defense firm hired Brammer and purchased a copy of the Project Workbench management software package from Applied Business

Technology Corp. in San Francisco.

Since that time, Project Workbench running on an IBM Personal Computer XT turbo clone has become "like a bible" to the firm, Brammer reports. As the manager responsible for scheduling, he spends more than 50% of his time using Project Workbench to create presentations, perform analyses, prepare proposals, list tasks, estimate project costs, allocate engineers to projects and write or update group reports.

Brammer may not have been the one to choose Project Workbench initially, but he maintains he is happy with the selection. "After I joined Loral-Conic, I evaluated other programs. I wanted a package that would be easy for engineers to learn and use," he recalls. Other considerations included price and the ability to handle group reporting as well as two features that Brammer strongly recommends: automatic scheduling and critical path analysis.

Brammer's evaluation brought him full circle: Project Workbench turned out to be the best product for the task at hand. The package's automatic scheduling function produces schedules that are consist-

*Paul Brammer, Loral-Conic's engineering program administrator*

tent with the dependencies of the project and available resources, Brammer notes. The critical path analysis feature of Project Workbench helps planners by flagging elements in the project plan that are inconsistent with critical dependencies in the project. These critical dependencies are activities that must occur before one or more of the other stages of the project can proceed. "Using Project Workbench, we can go through several iterations of the project so that everyone knows the critical items we cannot slip on," Brammer explains.

Working with a project management system has afforded Loral-Conic two primary benefits. First, it has provided time savings, most notably in the area of proposals, Brammer says. "Preparing proposals is a big part of my job, and before using Project Workbench, I had to prepare estimates manually." Second, it has given managers a better insight into the status of a project, he notes. With documents created from Project Workbench, Brammer explains, "managers can grasp immediately where we stand."

While the PC-based project management system effectively handles Loral-Conic's needs today, the subsidiary may well follow the prediction made by IDC's Fine and upgrade it to a larger computer in the future. Of Loral-Conic's PC-based management strategy, Brammer explains that "at some point, if we continue to grow as we have, we may have to rethink our strategy."

## Something keeping you from changing DB2 data structures?

It's not that you can't make a change; it's what happens when you do make a change. Changessaurus, that jealous guardian of the DB2 catalog, is dangerous when provoked. Because of the demands of Changessaurus, DBAs have spent upwards of 50% of their time battling complex change procedures.

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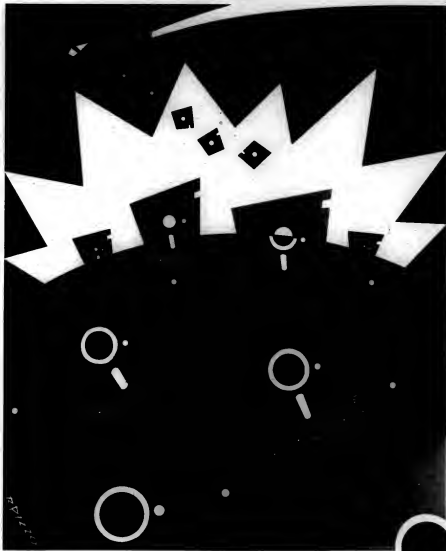
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## Vendor strategies in DB2 aftermath

BY MICHAEL TUCKER  
FEATURES EDITOR

**T**he mainframe software market will never be the same. Competitors have been reeling ever since 1985 when IBM dropped a bombshell with the introduction of DB2, a relational data base for mainframe systems. At the same time, it also announced that the SQL language would serve as the official, Big

Blue means by which users and data could be brought together.

Historically, the mainframe software market was dominated by a relatively few large vendors of data base products, while applications developers were distinctly poor relations.

With DB2's debut, everything suddenly changed. The data base independent software vendors, which before were the aristocrats of the industry, were scrambling to respond to radically new conditions. By early 1987, to counteract IBM's

affront, the independent software vendors had more or less settled on a set of three survival strategies, as follows:

- Obtain total compatibility of their products with DB2 via SQL, but surpass DB2 in terms of performance, integration and flexibility.
- Embrace DB2, regard it as a market and sell productivity tools.
- Move out of the data base business entirely and into applications.

Each of these strategies has

various advantages, but each has distinct drawbacks as well—drawbacks that are only now becoming apparent. After a year of experimentation, the question is which—if any—of the three strategies has proved successful?

When IBM introduced DB2 and announced its intentions of standardizing and expanding SQL, few of the independents said they believed the new product language or its query language was a threat.

Can PCs overcome small-systems snobbery? See story, page 30.

"Let's be candid. The independent software vendors didn't expect DB2 to be successful," says Shale Atre, president of Atre International Consultants, Inc., a Rye, N.Y., market research and consulting firm that watches the data base field. "They thought that its performance would be so bad that it simply wouldn't be a problem. Thus, they were caught completely by surprise."

The independent software vendors had discounted the DB2 threat for good reasons. Specifically, IBM had no history of being a good applications or data base software vendor. What software the company did market was widely regarded as little more than a loss leader for IBM's hardware.

However, as some industry observers pointed out even at the time, IBM's hardware bias was, in some ways, illusory. While the company had never been known for its applications, it had always maintained a powerful presence in systems software. Its operating systems, such as MVS/370 and VM/370, are among the largest and most complex commercial software projects ever devised.

Indeed, some analysts view the introduction of DB2 as the logical, upward extension of that systems software expertise. "It's important to understand that IBM has always supplied the lowest level of software," says Bahar Gidwan, vice-president of securities firm Kiddier, Peabody & Co. in New York. "The way that I view it is that, in DB2, the data base engine has slipped down in value... and, as such, it was only natural that IBM would move into [data base software]. In effect, we're seeing the entry of the data base management function into the operating system."

#### All shook up

Even if DB2 proves not to be the next step in the systems software evolution, its effects have been immense. The independent software vendors were badly shaken, and the old mainframe elite also reported depressed sales of their products. Atre says her research firm estimates that, eventually, as much as 65% of the mainframe DBMS market will go with DB2.

Equally distressing for the independents is that the application developers, which produce tools and application software that run atop DBMS products, are showing signs of abandoning the independent DBMS entirely.

For instance, VM Software, Inc., located in Reston, Va., markets productivity tools for data center managers. Pamela L. McFarland, VM Software's senior vice-president and general manager of applied relational technology, says that her firm intends to support DB2, but "as for the non-IBM data base market—absolutely not. I think the days of the non-IBM data base management system are numbered. We did a survey of our market, and some 60% of the respondents said they would buy IBM [products] and no other."

However, Atre notes, even if only 35% to 40% of the market remains, "that still leaves a big piece of pie for the independent software vendors. Of course, there may not be very many of them [left]."

The question for the independent software vendors is how to be in the select few that remain solvent. How does one

"The independent software vendors didn't expect DB2 to be successful. They thought that its performance would be so bad that it simply wouldn't be a problem. Thus, they were caught completely by surprise."

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compete with DB2 and IBM?

The answer, according to Robert Therrien, an analyst with New York-based Paine Webber, Inc., can be found, of all places, in the history of the Soviet Union. "Not that the analogy is precise," he notes, "but Vladimir Lenin once said, 'To defeat the enemy, it is neces-

sary to look like the enemy.' And that's exactly what the independents have done."

Specifically, the independents are scrambling to provide as much IBM compatibility in their products as possible. It is almost a replay of the clone wars in the PC market of the early 1980s.

One of the chief advocates of the compatibility strategy is Applied Data Research, Inc. (ADR) in Princeton, N.J. In September, ADR announced a series of products designed expressly to bring its software into the DB2 universe. Specifically, ADR revealed that its data base management system, Datacom/DB, as well as its productivity tools, such as the application development system Ideal, would support SQL.

Stephen Gerrard, ADR's vice-president of product marketing, says his company's approach is "to become the plug-compatible alternative to DB2."

The method ADR is using to make its product DB2 compatible is SQL. "What is strategic to the customer is SQL," not

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DB2," Gerrard says. "SQL has produced a situation in which data base management systems can be made alike and even interchangeable." In fact, he claims, it is already possible to develop SQL-based applications on DB2 and then have them run unaltered on ADR's Datcom/DB.

#### Compatible but better

Gerrard argues that to survive in the mainframe market, all DBMS vendors must adopt a similar strategy. "It is possible to compete with IBM products, but the DBMS that succeeds will do so by being compatible with, but better than, DB2. Our view is that this is the next stage of the evolution of the market — to

be compatible but better. The data base vendor who doesn't realize that is in trouble."

Basically, ADR envisions the future as a place in which the common language of SQL has turned data base engines into commodity products. Consumers would then make their purchases according to price and performance. That's a comfortable world for users but not for data base vendors, which would have to engage in constant product upgrades to maintain market share. And Gerrard says that, correspondingly, ADR has committed no less than 20% of its current revenue to research and development.

That price is high, but it seems that few data base vendors will be able to avoid

it. Computer Corporation of America (CCA) in Cambridge, Mass., for instance, is not a data base vendor that normally plays in the MIS arena. "CCA is in its own world," Arie says. "It has government and military contracts." But even that vendor, as isolated from DB2 as it might seem, recently announced an SQL capability for its mainframe data base product, Model 204.

#### Winner's tale

CCA's approach is summed up by Richard Winter, vice-president of product design for the firm. "DB2 will have a major impact on the industry. I think people may have overreacted to it, but it does create new requirements — that you support

SQL and that you support it well."

Thus, even though it operates "in its own world," CCA has come to terms with DB2. "We intend to carve a position for ourselves based on performance," Winter says.

But relying too heavily on SQL is not without risks. For one thing, this strategy requires vendors to become familiar with SQL very quickly. This could be difficult because many of the independent software vendors have felt they could safely ignore the language almost since its creation.

That lack of SQL familiarity has not been true for smaller vendors, because most of their products are meant for microcomputers. In the past, these smaller firms have maintained a strong interest in SQL to gain links between their micro-based systems and the IBM world. As early as 1984, Informix Software, Inc., located in Menlo Park, Calif., was advocating a standardized SQL as a means of joining its Unix-based DBMS to IBM systems.

Thus, the DBMS elite is now facing stiff competition from micro vendors, whose years of work with SQL gives them a distinct advantage in linking their products to DB2. According to Arie, "It's not just DB2 [the mainframe DBMS vendors] have to face. It's the second-tier vendors as well."

The most famous (though by no means the only) of these second-tier vendors may be Oracle Corp. in Belmont, Calif. In the few short months after DB2's introduction, Oracle has exploited its SQL links to become one of the most widely used personal computer DBMS products in corporate America.

Some analysts say they feel that the micro vendors stand a chance of replacing some or all of the mainframe DBMS vendors. Kidder Peabody's Gidwani says, "Will the little companies challenge the big vendors? It's already happening. Where did Oracle come from? There wasn't an Oracle to speak of five years ago. It's doubled in size in nine of the last 10 years."

Not everyone agrees. "This is not saying anything against Oracle, but they're really only done well in information centers," ADR's Gerrard remarks.

#### Bye-bye small guys?

One securities analyst, who asked not to be named, went even further, saying, "The big companies are getting bigger, and the small [firms are] going to get blown out of the water."

Still, it's debatable whether Oracle may be considered a small company waiting to die in the water. Oracle recently reported its first-quarter revenue for fiscal year 1988. As of August 31, 1987, the company says that its revenue increased 134% to \$41.3 million from \$17.6 million in the same period last year. These figures reflect a net income of \$3.2 million, compared with \$127,000 in the same period a year earlier.

But what if one cannot afford to put aside 20% of one's revenue for R&D as ADR has? "Well, the vendor that can't compete with IBM, [should instead] regard DB2 itself as a market," Gerrard suggests.

And many of the independent software vendors are, in fact, looking to port their programmer productivity tools to DB2. Gidwani, for one, says that this approach is one the vendors should have



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# Overcoming small-systems snobbery

BY MARTIN AZARNOFF  
SPECIAL TO CIO FOCUS

USING A PERSONAL computer for mainframe software development, testing and maintenance can often result in staggering productivity gains. But PC technology is still infrequently used for this purpose. Some say it is small-systems snobbery on the part of mainframe programmers. Others say that PCs are just not understood by mainframe personnel. Still others point to the administrative headaches brought on by site licensing and other software buying practices that vary from the PC to mainframe markets. Some PC software vendors just don't understand how to sell to the mainframe market, and some mainframe managers just can't overcome the confusion of managing the personal computer influx. But don't despair; there is progress.

Mike Reeves, software manager in Oklahoma's Tulsa County Data Processing department, says that at his organization, the move to PCs started a few years ago with stand-alone packages, such as spreadsheets and word processing software connected to the host using an emulation board. "Later, with the increasing software sophistication, we began looking at PCs as a way to gain back expensive

mainframe time," Reeves claims. He looked specifically at Cobol and CICS packages, with an eye toward giving programmers a package that looked and acted very much like the host.

CICS emulation programs, such as Triangle Software Co.'s CICS/PC offering, and Cobol workbench programs, such as VS Cobol Workbench from Micro Focus, Inc. in Palo Alto, Calif., are currently under review by many organizations.

"The PC is the future of mainframe computing," says John Zipp, president of San Jose, Calif.-based Triangle Software. But Triangle does acknowledge the resistance that many mainframe managers confront when programmers are asked to use a PC as a productivity tool.

"Most mainframe Cobol programmers are well set in their ways and resist migration to a PC," reports Norm Rosenthal, president of Tempest Systems, Inc., a West Norwalk, Conn.-based consulting firm specializing in product evaluations and market research. "Once programmers actively employ these products, they say they don't know how they got along without them. One Cobol programmer whose annual salary was double that of his colleagues finally told me his secret: When no one was looking, he would download his Cobol source code to the PC and work exclusively in that environment while his colleagues dozed quietly at their time-sharing option terminals."

According to Zipp, "There is no real question that development and maintenance of applications is migrating to personal computers—a phenomenon we're calling 'desktop development.'" There are several reasons why these desktop development programs have not taken the industry by storm, however. One big reason, Rosenthal explains, is that no one talks about them. He suggests that if an industry leader actively promoted the PC as a mainframe productivity tool, the concept might gain respectability.

Rosenthal tells of one programmer who spent 15 years maintaining a 400-module CICS/Cobol-based insurance package for a large Hartford, Conn.-based insurance company. "He was asked by his manager to download part of the system to a PC for a full trial. On the last day, he filed the following report: 'I have seen the light. With a product as powerful as this, you don't need me. I hereby resign.' He now works comfortably in downtown Philadelphia writing children's novels."

Though possibly fictitious, this tale has a ring of truth to it. Software that allows developing, testing, maintaining and debugging mainframe software on a PC is here to stay. "Tell your manager to do the job he was hired to do and to buy you a Cobol workstation," Rosenthal advises. "By the year 2000, there will be only two types of Cobol programmers: those who do it on a PC and those who go to bed hungry."

Aznaroff is a free-lance writer based in California's Silicon Valley who writes on topics of concern to MIS.

been taking all along. "The biggest mistake that the independents made was that they didn't understand that their real value wasn't in their DBMS products but rather in their tools," he says. "And their pricing reflected this [misconception]. They had it reversed, with higher prices for the DBMS than for the tools."

## Product line assembly

And as a result, several of the data base vendors are looking at making their tools into a product line. Most have already invested large sums into the production of code generators, fourth-generation languages, computer-aided software engineering (CASE) and the like that work on top of their DBMS products. It's a relatively easy task to then shift these products over to DB2.

But this strategy also has risks. There are a host of other vendors, already in the tool business, that are rapidly crowding into the DB2 market.

For instance, at a recent CASE symposium in Boston held by Andover, Mass.-based Digital Consulting, Inc., no fewer than eight new DB2-oriented CASE tools were in evidence. These included systems from established vendors—such as Sage Software, Inc. in Rockville, Md., and Computer Asso-

ciates International, Inc. in Garden City, N.Y.—and from some surprising new players, such as Dallas-based Texas Instruments, Inc.

It is well known for its position in both the engineering and scientific markets. However, last September, the company revealed its intent to be in the commercial software market as well. It introduced the Information Engineering Facility (IEF), a CASE product that company officials say spans the entire software production life cycle, from system analysis to code generation.

Other vendors make similar products and claims, but what makes TI's IEF particularly interesting is that it generates not only code but also data base applications that run on DB2.

Whether TI will be able to make a go of its IEF remains to be seen. The company's critics point out that it has little experience as a vendor of mainframe software. Worse, the firm does have some history of ill-timed ventures into new markets from which it was later forced to withdraw. The most famous of these debacles may be its disastrous entry into personal computing with the TI99 and TI99/4A computers between 1982 and 1983.

However, TI claims that it is in the mainframe CASE market

for good, and it has pledged considerable resources to the IEF effort. These resources include, for example, the creation of an entire research division devoted to the product.

But even if TI fails in its rally to bring CASE to the MIS world, the point remains that the DB2 tool market is getting crowded, and some of the vendors already in the market possess both the skill and will to make things very difficult for new DBMS entrants.

## The applications route

The last widely proposed strategy for mainframe DBMS vendors to embrace is to turn to applications software. "If I were a [mainframe] vendor," Paine Webber's Therrien says, "I'd want to get into applications—to not just for the revenue they'd produce in their own right but also to get people on to my DBMS."

Therrien notes that financial applications look hot and that Culinet Software, Inc., among others, seems to be taking this particular route. Meanwhile, Cincinnati-based Cincom Systems, Inc. seems to be staking out the manufacturing market. However, Therrien also points out that there is a trade-off here. For every dollar invested in the production of application software, there is one dollar less for

data base R&D.

Thus, some vendors cannot afford to get into applications without basically abandoning the data base product that made their business in the first place. ADR, for instance, flirts regularly to get into the applications game, at least for the time being, so that it can devote every possible resource to making its DBMS compatible with, but better than, DB2.

Analyst Atre notes that there is another, sometimes hidden, cost for DBMS vendors that try to get into applications—the price of obtaining vertical market expertise. "Unless you have years of experience [in a particular vertical market], don't get into it," she warns.

She adds that for the company that is bound and determined to go from DBMS products to applications, "perhaps you should consider acquisitions. ADR isn't in a bad position to do that, by the way. They've got the deep pockets provided by Ameritech." Ameritech is a regional Bell holding company and ADR's parent corporation.

But the biggest challenge to going with the applications solution to the DB2 problem is that, even in this enlightened age, the mainframe application software market remains a bit hypothetical and unproven. "Right now, we depend on in-house soft-

ware," one mainframe user says. "There are no plans that I know of to go buy somebody else's bugs."

**You take your chances.** In short, none of the emerging strategies for surviving in the wake of DB2 is a sure path to success. Individually or in combination each could probably provide survival in the new world order of mainframe software. But, in turn, each strategy also comes with unique risks that are almost as deadly as the introduction of DB2 was in the first place.

Ultimately, industrial observers seem to say that victory will go to the vendor that can balance these risks against one another and be so fast on its feet that it can avoid being trapped by any of the drawbacks. As VM Software's McFarland puts it, "To survive as a DBMS vendor, I would watch IBM very closely. I'd try to anticipate what the market was going to do next, and I'd keep checking to make certain I wasn't sitting on a railroad track."

Atre agrees with McFarland's advice, but she puts a different, more ominous perspective on the DBMS arena. "In this market, when a company becomes arrogant, it is surely doomed." ♦

# SQL sets the trend in relational market

BY STAN KOLODZIEJ  
SENIOR EDITOR

**T**he relational database market is booming when they first appeared, IBM's DB2 and SQL have become the tune by which the rest of the relational data base market is dancing.

SQL, developed by IBM in the late 1970s, is an important part of the relational data base management systems market because it defines the format through which data is handled in relational data bases. Though sanctioned by both the American National Standards Institute and the International Standards Organization, SQL in itself has little to offer users. Much criticized for its rigid, unyielding user interface, SQL has fostered a booming subindustry of third-party software developers offering SQL enhancements or replacements, usually written in nonprocedural, fourth-generation languages.

In fact, many software developers of relational DBMS produce their own SQL replacements to further the effectiveness and selling features of their relational systems.

Atlanta-based Management Science America, Inc. (MSA), for example, recommends that clients of its General Ledger system use MSA's fourth-generation language-based Information Expert to access data directly from DB2 data bases.

Others are also expecting to see more SQL generators, most likely written in fourth-generation languages, coming into the market. Such generators will enable users to keep the warm feel of familiar interfaces such as spreadsheets as well as those found in more advanced graphical user interface management systems now on the market. Generators will then translate such interfaces into executable code for generating end-user applications, masking the behind-the-scenes software translations from the user.

"There's a real opportunity for vendors to come in with alternate or support products for SQL," says Brian Cohen, MSA's director of product planning. He adds that MSA's Information Expert has its own data dictionary facility that enables users to define their own interfaces.

Munt Software International, the Wilton, Conn., supplier of

the Nomad relational DBMS, claims the conversion of data from Nomad data bases to SQL is automatic with a single user command that unbooks and replaces the data base engine, independent of the application and transparent to the user.

The Development Products Division of Novell, Inc. has replaced SQL entirely with XQL, its relational data base query language modeled after SQL.

As for DB2, IBM introduced the relational DBMS in 1985 in a market that was already trying to come to terms with existing relational products from the likes of Alameda, Calif.-based Relational Technology, Inc., Oracle Corp. in Belmont, Calif., Westwood, Mass.-based Cullinet Software, Inc., Gupta Technologies, Inc. located in Menlo Park, Calif., and others.

But despite the hawkeye reception, both SQL and DB2 have succeeded in producing a ripple of events.

SQL and DB2 are generally considered below the top of the line in their product categories. Both were slow off the mark in user acceptance. Both did not initially fare well against competing products. But both are now considered standards.

In a matter of two years, IBM has managed to direct momentum behind DB2, enough to make most independent software developers jittery about the consequences of not supporting the DBMS. Vendors have learned in the past that ignoring IBM's market presence could be disastrous.

"What else can you do?" asks John Imlay, chairman and chief executive officer of MSA. "SQL and DB2 are the standards we have to work with."

Seeing the writing on the wall, the independents have gradually been falling in line behind DB2. Software AG of North America, Inc. says its Natural 2 data base will support DB2; Applied Data Research, Inc. (ADR) says it is committed to getting its Ideal data base system behind DB2; Cincom Systems, Inc. has declared its Sanyo data base will support SQL and DB2; and Cullinet has stated it will roll out products supporting SQL on IBM 9370 departmental systems.

IBM has been successful, to date, in temporarily putting the plans of independent relational DBMS mainframe competitors on hold. Relational Technology's Ingres for IBM's VM operating system, for one, is appar-

ently selling slowly, according to industry insiders.

Yet Doug Baer, a senior product manager at Cincinnati-based Cincom, remains unperturbed about IBM's taking the lion's share of the relational DBMS market.

"The history of IBM seems to be that the bigger it gets, the more opportunity it creates for others in the market," he says.

But it's not just in a marketing sense that DB2 and SQL are important. SQL and DB2 promise to have an impact on almost all areas of the industry.

SQL and DB2, for example, will cut across system platform sizes — from micros to the biggest mainframes — and will change the way these systems relate to one another. One result of this standardization is that SQL and DB2 may finally push distributed data bases ahead.

ADR, for example, has announced a distributed data base product, and Los Angeles-based Terasdata Corp. has integrated SQL with its DBC 1012 distributed data base systems. And both Oracle and Relational Technology say they are committed to the concept of supporting and developing distributed DBMS in the near future.

## Data log

For Don Watford, a product marketing support representative at Terasdata, SQL is a realistic means to increase the data distribution within an existing paradigm in which corporate mainframes supply only 15% of the current millions of instructions per second but retain 80% of the corporate data.

"Until now," Watford says, "distributed data bases have had more to do with communications than with distribution. But SQL will be a key in getting distributed data base applications to run across multiple platforms."

Perhaps even more significant, SQL and DB2 are standards that are cutting across industry disciplines, pulling together what were once distinct technologies, such as computer-aided software engineering (CASE), artificial intelligence and fourth-generation languages.

According to Linda O'Keefe, director of the Office Systems Industry Service at Dataquest, Inc., a San Jose, Calif., research firm, "Systems suppliers are retaining the proprietary nature of their CPUs but are standard-

izing on software in networking and other areas. Standardization doesn't mean a fewer number of product options for users; it means just the opposite. It can be a base for vendors to build and diversify their product lines."

SQL and DB2 are already attracting CASE vendors. Looking at the recent cooperative ventures of some data base and CASE vendors, Grey Greenfield, vice-president of marketing for Sage Software, Inc., a Rockville, Md., CASE developer, says that only those CASE developers that provide the complete life cycle stages of automated applications development will also be able to provide a seamless integration of DB2.

Greenfield says that Sage is positioning its recently introduced APS/DB2 Data Base Painter as a nonprocedural data administration tool used to define DB2 data base structures outside the DB2 environment, without users having to wrestle with DB2's syntax.

Oracle has indicated that its SQL Design Dictionary is a CASE design, development and documentation tool used to control and document all phases of a system's life cycle from requirements definition to maintenance. Supporting this CASE system is Oracle's SQL Development Method, which uses entity-relationship analysis methodology to model requirements for applications.

However, if IBM has put its clamp on the mainframe relational DBMS market, the micro market is wide open.

Following the example of mainframe vendors, several micro software developers have been engaged recently in cementing alliances with other companies, buying relational expertise and expanding their own products to ready for the relational DBMS fight ahead.

Winace Apple Computer, Inc.'s recent minority interest in

Sybase, Inc., a relational mainframe DBMS vendor. The Sybase deal was driven by Apple's Strategic Investment Group, which was formed in May 1986 with a mandate to make significant investments for future product direction. Sybase is also reportedly talking about relational DBMS with Microsoft Corp.

"Microsoft is no doubt planning to use Sybase to get its products across system platforms, including mainframe systems," says Mike Cohen, an analyst with I, a Mountain View, Calif., research firm.

## Follow the leader

Other micro software vendors are following suit. Borland International, Inc.'s purchase of software developer Ansa Software has led to a recent declaration by Borland that Ansa will deliver SQL support for Paradox, Ansa's micro-based relational DBMS. Borland claims that in the future such SQL support will enable Paradox users to plug into mainframe relational DBMS.

Ash-ton-Tate Corp.'s recent purchase of Orinda, Calif.-based Wordtech Systems, Inc.'s relational DBMS should help Ash-ton-Tate bolster its Dbase III DBMS with a new SQL relational DBMS.

And IBM no doubt will do some market damage when its SQL relational DBMS is scheduled to appear in 1988, embedded in IBM and Microsoft's OS/2 operating system, which will run on IBM's Personal System/2 microcomputer line. The IBM SQL software reportedly will contain user-directed query facilities, application development tools, a report generator and transaction recovery and concurrency control.



But all these SQL vendors will be chasing Oracle, the present market leader in micro-computer, SQL-based software development.

In the meantime, however, Oracle continues to be a moving target. The Belmont, Calif., company recently introduced Professional Oracle, Network-station Oracle and Lanesaver Oracle, three SQL-based products taking dead aim at the growing market for Intel Corp. 80386-based microcomputers.

All of this DB2 and SQL activity might still have some selling to do, however, before relational DBMS really catch on. The truth is, not everyone is happy with DB2 and SQL.

"We found DB2 hard to use and not as flexible as the relational system [Cincom's Supra] that we now use," says a Midwest data base administrator who asked not to be named. "Mind you, with flexibility comes more complexity," he explains.

Bill Lentz, information center analyst at Wilson Sporting Goods Co., located in River Grove, Ill., says that at his firm, MIS consideration of DB2 and relational DBMS in general is a slow process.

"MIS is still very much a third-generation language operation," Lentz says. "It'll take some convincing" to get it over to the relational side.

## Relational DBMS have yet to live up to their promise

FOR SEVERAL YEARS, MIS managers have been asking the computer software industry for a less rigid way to format and retrieve data. The answer came in the form of relational data base management systems.

But relational DBMS have not quite lived up to their promise. They have been designated as one of the key technologies behind the well-publicized, but stalled, drive to distribute data bases throughout U.S. corporations. In fact, the software developers' failure to market relational DBMS has been pointed to by some observers as a major reason why the long-awaited movement to widespread corporate departmental computing has so far been more of an exercise in theory than in practical application.

The technology's disappointing history has produced its share of skeptics. There are those who believe that relational DBMS are in danger of failing to deliver the distributed goods.

Brian Cohen, director of product planning at Management Science America, Inc., a software vendor in Athleta, declares that it will be some time before customers have the data base environment required to fully implement relational data bases.

"Although people have been asking for it for about 10 years," Cohen says, "the marketplace for relational technology will grow slowly."

"There is no way that most U.S. corporations need or have the computing environment [mature enough] to handle relational data base technology," claims Kurt Christoff, a senior partner at Information Processing Associates, a Memphis-based consulting firm. "Relational systems are being promoted as the panacea for a lot of problems, even those that are not related to data bases. I think too much is being expected of them," he says.

However, one data base administrator for a large conglomerate in the Midwest, who wishes to remain anonymous, has great expectations for relational systems in general.

"We've created a corporate data model, and distributed data is where we're going," the administrator says. "Relational data base systems are going to get us there."

Maybe so. But there seems to be a long way to go before a consensus is reached regarding the best blend of hardware and software necessary to deliver the benefits of relational DBMS throughout user companies.

Linda O'Keefe, director of the Office Systems Industry Service at Dataquest, Inc., a San Jose, Calif., research firm, says she thinks that powerful and relatively inexpen-

sive Intel Corp. 80386-based micros are going to make fine relational data base servers in local-area networks (LAN). O'Keefe has drawn a scenario of 386-based LAN platforms running relational DBMS and linking distributed data base managers to end-user micro workstations.

"The existing links between data bases in multivendor environments is not enough now," O'Keefe says. "It's a bottleneck that relational DBMS will open."

There are indications, however, that relational DBMS is not just another technology for corporate America to absorb. The technology is a strong catalyst creating a push-pull effect on other parts of the computing industry. The rising client interest in relational DBMS has tended to push vendors of nonrelational DBMS out to the market periphery where they are perceived by many as being out of sync with the progressive march of data base technology.

On the other hand, the relational DBMS market has been pulling certain firms together, causing some unusual alliances, according to Mike Cohen, analyst at Input, a Mountain View, Calif.-based research concern.

"During the past year, there have been some 'unholy' alliances between such companies as Panosonic Systems, Inc. and Cadre Technologies, Inc. and others," Input's Cohen says. "Such joint ventures are aimed at combining resources to develop complete computer-aided software engineering [CASE] development systems, joining together separate data base and CASE expertise."

Mike Cohen says the trend to acquire or jointly market existing software expertise will accelerate in the relational DBMS field. For example, Relational Technology, Inc. and Panosonic have teamed up to develop an IBM MVS version of Relational Technology's Ingres relational DBMS. Applied Data Research, Inc. (ADR) and Software Systems Technology, Inc. recently announced a licensing agreement enabling ADR to acquire XDB, Software Systems' relational DBMS for IBM Personal Computers.

It comes as no surprise that relational DBMS are becoming a corporate political football because MIS and corporate departments have been fighting for control of existing and new software technologies.

"Most of the exciting software stuff now occurring is happening at the departmental levels, not at the mainframe level," explains Mike Cohen. "Relational DBMS are going to strengthen departmental computing," he reports. —STAN KOLACOSKI

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# CASES

## COMPUTER-AIDED SOFTWARE ENGINEERING SYMPOSIUM

### Guest Speakers

Paul Bussatt	Rick Futer
Richard Carpenter	Ron Ross
E. James Emerson	Martin Sprinson
Dennis Hatley	Paul Ward
Carma McClure	John White
Ken Orr	Edward Yourdon

Toronto, January 19-21, 1988  
Atlanta, February 22-24, 1988  
Boston, April 25-27, 1988

#### PRESENTATIONS BY:

ADPAC COMPUTING LANGUAGES CORP.  
ADVANCED LOGICAL SOFTWARE  
ACS MANAGEMENT SYSTEMS  
AMERICAN MANAGEMENT SYSTEMS  
APOLLO COMPUTER INC.  
ARTHUR ANDERSEN & CO.  
ARTHUR YOUNG & CO.  
ASTYST TECHNOLOGIES, INC.  
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BACHMAN INFORMATION SYSTEMS, INC.  
CCL SYSTEMS, INC.  
CHEN & ASSOCIATES  
COMPUTER SCIENCES CORP.  
CORTEX CORP.  
D. APPLETON COMPANY, INC.  
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JAMES MARTIN ASSOCIATES

KEN ORR & ASSOCIATES  
KNOWLEDGEWARE, INC.  
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LEARMONTH & BURCHETT MANAGEMENT  
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THE CADWARE GROUP  
TRANSFORM LOGIC CORP.  
VSAOFT  
VISUAL SOFTWARE  
YOURDON, INC.

#### THE FIRST CONFERENCE OF ITS KIND ON COMPUTER-ASSISTED APPLICATION DEVELOPMENT

If you are responsible for developing software, we want to alert you to a dramatic change which is taking place in software tools. CASE, the most advanced, most comprehensive software technology yet. Taking the best from 2nd, 4th and 5th generation technologies, CASE is replacing fourth generation tools as the number one high productivity software development technique. This new software technology is for use in all types of software development/maintenance projects - large and small systems, commercial and real-time embedded applications.

The CASE technology is a combination of software tools and structured methodologies. CASE provides the software developer with a set of well-integrated, labor-saving tools linking and automating all phases of the software life cycle. CASE also makes manual structured methodologies practical to use by automating the drawing of structured diagrams and the generation of system documentation and code.

The CASE Symposium (CASES) is the best way for you to learn about the CASE concept and to see CASE tools first hand. In three intensive days, you will be able to evaluate, compare and contrast these approaches and incorporate CASE effectively within your software development organization. Past attendees have said that this conference saved them significant time and money by allowing them to research CASE and see vendors all in one place.

Please read this informative brochure for a complete description of the ORIGINAL and BEST ATTENDED educational forum on CASE. With the use of workstations, LANs and PC-based tools, CASE promises to greatly improve the software development environment. You need to be aware of this important field, and how it can improve your company's application development program.

Sincerely,



Paul Ward  
Consultant  
Software Development

Dr. George Schussel  
President  
Digital Consulting, Inc.

Dr. Carma McClure  
Author and Lecturer  
Structured Techniques  
The Basis for CASE

# Computer-Aided Software Engineering Symposium

## SYMPOSIUM CHAIRMAN



**Dr. Carme McClure - Keynote**

Dr. Carme McClure, internationally known author and lecturer, will lead the CASE Symposium overview. Dr. McClure specializes in software methodologies, software law and project management. Since 1974, she has served as a software consultant and has worked with major corporations including Blue Cross, Blue Shield, GTE, Bell Labs, Diebold, TI, DEC, and DuPont. Dr. McClure is a software engineer and has taught software engineering courses at Illinois Institute of Technology (IIT) and Northwestern University. She has served as a National ACM Lecturer and has conducted seminars on software maintenance. Her publishing credits include numerous articles on software and six books, including four coauthored with James Martin.



**Paul T. Ward**

Paul T. Ward is a software development consultant, specializing in requirements specification, high-level software design, training of development personnel, and methodology definition for real-time systems development projects. He has experience in systems development in both real-time and business environments. Prior to opening his own consultancy, Mr. Ward was with Yourdon, Inc. where he served as an instructor/consultant, as Technical Director for Systems Development, and finally as Vice President for Research and Development. While at Yourdon, Paul served as a consultant on real-time systems to a number of scientific, engineering and governmental clients. He is also the author of numerous books, including one on Real-Time Systems.

## Day One CASE Outline

1. Overview of computer-aided software engineering (CASE)
2. CASE technology
  - a. What is CASE technology
  - b. Automation of automation
  - c. Automation of software life cycle
  - d. Linking design automation and program automation
  - e. Total solution to software crisis
  - f. Evolution of CASE technology
3. Characteristics of CASE systems
  - a. New software development environment
  - b. Graphic design capabilities
  - c. Central information repository
  - d. Tightly integrated tool sets
  - e. Full life cycle coverage
  - f. Prototyping support
  - g. Automatic code generation
4. Review of vendor products
  - a. CASE toolkits
  - b. CASE workbenches
  - c. CASE methodology companions
5. CASE environment
  - a. PC workstations
  - b. PC tool sets
  - c. Mainframe tool sets
  - d. PC-mainframe link
  - e. One, two, and three tiered architectures
6. Changes to the software life cycle
  - a. Front end loading
  - b. Object-oriented program design
  - c. Minimizing manual implementation tasks
  - d. Rapid iterative prototyping
  - e. Minimizing the need for testing
7. CASE productivity benefits
  - a. Increasing productivity by a factor of 20
  - b. Getting more from each developer
  - c. Reducing the change and maintenance effort
  - d. CASE studies on CASE
  - e. Short/long term benefits
8. Related technologies
  - a. CASE's dominant role
  - b. Software reusability as a development methodology
  - c. Role of COBOL
  - d. Absorption on fourth generation
  - e. Incorporation of fifth generation technologies
  - f. Emerging issues
9. Future trends
  - a. Habitable environment
  - b. Intelligent training systems
  - c. Intelligent methodology drivers
  - d. Software reusability
- f. Merging development and maintenance strategies

## Real-Time Seminar

- Concurrent Afternoon Session**
1. Vendor Survey: Who are the scientific/engineering CASE tool vendors?
  2. Modeling Paradigms by Vendor
  3. Life Cycle Coverage by Vendor
  4. Depth of Model Analysis by Vendor
  5. Code Generation Capabilities by Vendor
  6. Project Management/Documentation Support by Vendor
  7. Common Work Environment Support by Vendor
  8. Delivery Platform by Vendor
  9. Product Development Trajectory by Vendor



# CASE Technology

## WHAT YOU SHOULD KNOW ABOUT CASE TECHNOLOGY

CASE Technology brings the same benefits to software development as CAD/CAM has brought to manufacturing. Both CAD/CAM and CASE enforce a disciplined, engineering approach to the development of systems. Both use interactive graphical design techniques, design checking rules, encyclopedias of design elements, and simulation. The techniques are applied and enforced throughout all phases of the design, development, manufacturing, testing, deployment, and maintenance process.

**Front-end CAD/CAP diagramming techniques:** Most CASE tools utilize computer-aided design and programming techniques to create diagrams of the system design. Analysts are able to create, verify, and revise drawings on an interactive screen. Specifications for the system are stored in graphical form in a central dictionary or encyclopedia.

**Design analyzers:** The function of the design analyzer is to detect internal inconsistencies, ambiguities, and omissions in the design specifications. Design analyzers in CASE tools are being improved rapidly to incorporate smart editors, intelligent assistants, and expert systems.

**Code generators:** Many CASE tools are moving toward the incorporation of a code generation module which generates application code automatically from consistent design specifications.

## SPECIFICATIONS

**Encyclopedia or repository:** A number of CASE tools incorporate an automated encyclopedia which is used as a central repository of knowledge about the enterprise and its structure. Sufficient detail is maintained about the design of a procedure so that program code for that procedure can be generated automatically.

**Expert Systems:** A few CASE tools are beginning to incorporate expert systems that apply inference processing to a knowledge base which contains data and rules. Expert systems are being used to detect inconsistent or incorrect data base actions.

**Methodologies:** CASE tools are moving toward the incorporation of a disciplined methodology that guides the analyst step-by-step in the application of the tool.

The functions of CASE tools are described in Figure 1 below. All of these concepts and the tools which implement them will be discussed and analyzed in CASES.

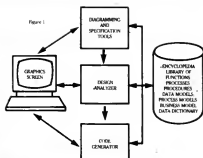


Figure 1  
*Day One of the CASE Symposium provides a comprehensive review of the CASE technology, the characteristics of CASE systems, and the CASE development environment.*

## MAJOR TRENDS IN CASE TECHNOLOGY

The design of CASE products is being driven by important technology trends in the following areas:

**Human factoring:** Major improvements have been made in human interfaces, including simplified, intuitive command interfaces, elimination of alien syntax, use of graphics, etc.

**PC orientation:** Many CASE products are available as intelligent workstations within the PC environment. The PC environment provides dedicated processing capability, decisecond response time, superior graphics, and access to thousands of PC software support packages.

**Design automation:** Front-end graphical design techniques are being improved rapidly. These support the specification of systems in graphical form using consistent diagrams that are sufficiently complete to be converted automatically into code.

**Artificial intelligence:** CASE tools are making increasing use of AI techniques, including the incorporation of expert system shells and a knowledge base of rules of inference.

## THE UNIQUE SYMPOSIUM FORMAT

### Day One

On the morning of the first day of the CASE Symposium, you will attend a seminar taught by Dr. Carme McClure, which provides up-to-the-minute information on CASE. Dr. McClure will cover all aspects of this rapidly changing technology, including the automation of the software life cycle, CASE productivity benefits, related technologies and future trends.

In the afternoon, Dr. McClure will present a product review session on all products being presented at the symposium. These product discussion sessions will help you decide which sessions to attend on Days Two and Three. In addition, Paul Ward will give a special pre-

sentation on Real Time CASE Systems. This presentation will run concurrently with Dr. McClure's, and will feature a Real Time CASE product review session to prepare you for the Real Time product presentations.

### Days Two and Three

Throughout Days Two and Three, you will have the opportunity to attend one hour product presentation sessions. These presentations run concurrently throughout the day, and you may move between them as you wish. Many companies send more than one attendee to the conference in order to receive the maximum benefit. In addition, throughout these days you will have the opportunity to hear industry leaders as guest speakers discuss different aspects of this rapidly changing technology.

## Days 2 & 3: Product Presentations

### ADPAC COMPUTING LANGUAGES CORP.

Adpac Computing Languages Corporation develops, markets and services technology support tools for the IBM mainframe operating under MVS. Adpac's CASE tools (DDE and DESIGN) provide a front-end CAD/CAM design technique that assists analysts in drawing any type of diagram and design analysts with the capability to verify the contents of diagrams.

### ADVANCED LOGICAL SOFTWARE

Advanced Logical Software develops and distributes integrated CASE tools for the Macintosh. ANATOL implements Structured Systems Analysis by integrating hierarchical data flow diagrams, a data dictionary and pseudo-code specifications. Consistency checks maintain accuracy between parent and child diagrams by cross-checking the dictionary. Files may be exported to other systems.

### AGS MANAGEMENT SYSTEMS, INC.

AGS/MS is recognized as the world's leader in systems development methodologies and project management systems. MULTI-CAM, the micro-mainframe CASE system created by AGS/MS, integrates software development tools, software design and production models, project management and any other user-selected CASE tools into a unified automated work environment.

### AMERICAN MANUFACTURING SYSTEMS

AMS is a major computer services firm specializing in applications development. AMS's Life Cycle Productivity System (LPS) integrates productivity tools from AMS and other vendors for strategic system planning, design, development, maintenance, and project management. LPS produces all deliverable work products required by most methodologies. Major portions of LPS operate on PC's implementation, configuration control, and foundation software modules operate on IBM mainframes.

### APOLLO COMPUTER INC.

Apollo Computer Inc. is a leading supplier of workstations and software tools for the computer-aided software engineering (CASE) market. Over 70 of the industry's top third-party CASE solutions are offered. In addition, Apollo offers Domain Software Engineering Environment (DSEE III) - the workstation industry's most popular source code control, configuration management and project coordination tool - for managing large-scale development projects.

### ARTHUR ANDERSEN & CO.

The Arthur Andersen Worldwide Organization provides professional services in accounting and audit, tax and management information consulting. Arthur Andersen will demonstrate Design I, a PC-based software tool which assists in the planning, analysis and design phases of the on-line system life cycle, and will present Install I, which addresses the implementation and support phases.

### ARTHUR YOUNG & COMPANY

Arthur Young is an international accounting, tax and management consulting firm and is working with KnowledgeWare to develop the Information Engineering Workbench (IEW). In addition to using the IEW for systems building and marketing the products internationally, the AY/IEW was developed to provide methodological and management underpinnings for information engineering.



**PAUL BASSETT**  
Vice-President of Research  
Netron, Inc.  
*An Engineering Basis for Integrating the Software Life Cycle*



**RICHARD CARPENTER**  
Chairman and CEO  
Index Technology Corp.  
*CASE: The Pace Quarters*

### GUEST SPEAKERS

#### ASYST TECHNOLOGIES

THE DEVELOPER, an IBM PC-based workbench software provides a generic multi-user automated support for the entire systems development process. As opposed to a methodology driven tool, THE DEVELOPER allows the use of any methodology at all desired levels of compliance and rigor. Its CUSTOMIZER module, coupled with its Import/Export functions, allows a user to import product's such as code generators and central data dictionaries.

#### ATHERTON TECHNOLOGY

Atherton Technology is the originator of the Software BackPlane, the first commercially available integration and portability platform. The Software BackPlane increases the level of productivity in large-scale software development environments by providing facilities for a common user environment, increased control and coordination of tools and data, and hardware platform independence.

#### BACHMAN INFORMATION SYSTEMS, INC.

Bachman Information Systems, Inc. is exhibiting a new kind of Computer Aided Software Engineering system, which will enable MIS departments to adapt their existing applications to new business requirements. The BACHMAN Product Set supports the development of new applications while also supporting existing applications, enhance, extend, and migrate capabilities. MIS departments need to control the largest component of their workload.

#### THE CADWARE GROUP, LTD.

The CADWARE Group designs, produces, and markets rule-based modeling tools for complex systems. Managers, planners, systems analysts, and designers use these tools to help manage the complexity of defining and evaluating mission-critical business, industrial, and technical systems. CADWARE's PC-based tools adapt to the system definition methods and practices that you use. Models and designs may be used to automatically generate data bases, operational software, and system documentation.

#### CGI SYSTEMS, INC.

PACBASE, a full-cycle CASE product, integrates. Manthram and PC based analysis and design workbenches for the development and maintenance of application specifications through active prototypes, a centralized enterprise-wide dictionary that controls and manages all business specifications directly into complete COBOL applications, including all code and documentation.

#### CHEN & ASSOCIATES, INC.

Chen & Associates, Baton Rouge, Louisiana, is a leading company producing products, training, and consulting in data-oriented system development. Products (PC-based) to be presented are: ER-Designer, which defines your information requirements in Entity-Relationship diagrams, SCHEMAgen, which generates schemas for your database systems (from macro-based to mainframe based), Normalizer, which normalizes data or words.

#### COMPUTER SCIENCES CORP.

Computer Sciences Corporation, Technology Activity, CSC's Design Generator is an Object Oriented expert system that automatically selects a central transform from a database diagram and generates an initial design in structure chart notation. The graphic-intensive user interface features point'n'click, pop-ups and multi-pane browsers.

#### CORTEX CORP.

CorVision is an application development system that automates the entire software development cycle for the DEC VAX/VMS environment using a technique called Picture Programming. Picture Programming allows DP professionals to visualize an application by diagramming the design and then automatically generating a production-ready application directly from the pictures. CorVision is built on application generator technology for the DEC VAX Application Factory.

#### D. APPLETON COMPANY, INC.

D. Appleton Company (DACOM) solves business responsiveness problems by applying asset-management principles, practices, and tools to information. DACOM methodologies for information system planning, RAI, and development, POM when coupled with Data Resource LEVERAGE (data and activity modeling with the JANUS software), enables teams of professionals to use and reuse data assets for improved productivity.

#### DIGITAL EQUIPMENT CORPORATION

As a leading computer manufacturer, Digital provides a range of integrated Application development tools for solutions to business and engineering problems. The unique offerings are workstation based and address all aspects of the Applications Development Life Cycle. They are integrated into the VAX hardware, software and network architecture to provide enterprise wide solutions.

## Days 2 & 3: Product Presentations

### GUEST SPEAKERS



**K. JAMES EMERSON**  
Vice-President of Technology  
Panosip Systems, Inc.  
The Integrated Repository



**DERRICK HATLEY**  
Principal Staff Engineer  
SLJ Avionics Systems Corporation  
Criteria for Automating Real-Time  
Requirements Specification

#### DEUS

Deft is a suite of Computer Assisted Software Engineering (CASE) tools, widely used for systems analysis design in North America and Europe. Deft supports dataflow, program-structure and entity-relationship diagrams, a data dictionary and forms design. Development projects using Deft have reported significant productivity gains in all phases of system building: analysis, design, development, documentation and maintenance.

#### ERICO TECHNOLOGIES, INC.

AMC-TEAM is an integrated and comprehensive CASE product supporting the IBM mainframe environment. CONSTRUCTION COMPONENT: Helps design as a team. Complete repository. Resuable parts. Interfaces to PC diagramming tools. Generates and documents entire Batch/Online Program. MANAGEMENT COMPONENT: Automatically monitors and collects management information. Enforces your standards. Tracks your development phases, easily migrates with import features. AMC-TEAM learns how you develop software.

#### EXSYS, INC.

EXSYS, Inc. will demonstrate EXSYS, the Expert System for Business Software Development. The objective of EXSYS is to make software development a pure analysis exercise, through statements of facts made in English. The information gathered in the analysis process is stored in a highly-structured repository, which is also used at run time, eliminating the need for the generation of code.

#### HEWLETT-PACKARD

Hewlett-Packard supplies a full line of computers, software, and peripherals to provide solutions to business and engineering problems. HP TEAMWARE is a computer-aided environment for software requirements definition and design, supporting the Structured Analysis and Design methods for general systems and real-time applications. HP TEAMWARE, together with HP editors, compilers, debuggers, forms a complete environment for software analysis, design, and implementation.

#### HOLLAND SYSTEMS CORP./

**DELOITTE HASKINS AND SELLIS**  
Deloitte Haskins & Sells and Holland Systems Corp. have pooled their present consulting and software product expertise in the IBM area. The result is a line of products that address the entire information resource management process... from business modeling... to database design and analysis... to application development and implementation. The companies will feature the 4900 line of IBM products.

#### IBM

IBM Scientific and Technical Computer Systems has embarked on a program to build Software Engineering solutions for the engineer/scientist utilizing currently available hardware and software. The solution architecture is based on mid-range processors, PS/2 and RT-PC workstations, connection with OEM systems and inclusion of high-quality IBM and third party software tools.

#### I-LOGIC, INC.

I-Logic, Inc. pioneers the frontier of system design automation with STATEMATE, the only available tool that models the dynamic behavior of real-time systems as well as system functions and architecture. With STATEMATE, users produce a specification that is compiled allowing its execution to be viewed on the screen. STATEMATE is a comprehensive tool set for real-time system developers based on the statecharts method of specifying and analyzing reactive system behavior.

#### INDEX TECHNOLOGY CORPORATION

Index Technology Corporation develops and markets products that automate the systems development life cycle. Products support strategic systems planning, analysis and design of systems, project planning and a series of ISM interface products that provide linkages to leading code application generators. These products provide an extensible, flexible and integrated systems development environment for large and small projects in both the DOS and VMS environments.

#### INNOVINE, INC.

InfoSys, Inc. is a leading edge company focused on information system design and is solely responsible for the marketing and distribution in North America of MASTER, a PC-based CASE tool and methodology, based on the E-R (Entity-Relationship) approach to systems planning and design. MASTER accommodates numerous approaches to the problem of analysis, design and documentation of all design activities relating to the conceptual, logical and physical model of data and processes in an information system.

#### INTERACTIVE DEVELOPMENT ENVIRONMENT (IDE)

IDE, a product, Software through Pictures, is a set of integrated graphical editors and error-checking tools supporting structured analysis and design methods. The editors are linked to a Data Dictionary supporting definition of names, types, constants and associated text. Users can generate Ada declarations and define process and module templates to generate specifications.

#### INTEGRATED SYSTEMS, INC.

AutoCode focuses on the needs of Real-Time Software Engineers and addresses all steps from analysis to design, simulation and code generation. The graphical specification environment features engineering block-diagrams, data flow/control flow, state transitions, and process descriptions. Ward-Mellor real-time software methodology with Boeing-Harley extensions are included in an environment where simulation and analysis can be performed for design verification, and real-time code in C, Ada or Fortran can be generated automatically.

#### JAMES MARTIN ASSOCIATES

James Martin Associates is an international consulting firm and is considered the world leader in the development of improved systems development methods and CASE tools to support these methods. JMA's teams provide commercial and government clients with services in a range of technical and managerial disciplines, including the development, selection, and use of CASE tools, data base consulting, information strategy planning, technology integration, and technical training.

#### KEN ORR & ASSOCIATES, INC.

Ken Orr & Associates, Inc. specializes in building integrated software engineering environments that incorporate technology, tools, and training for maximum productivity. The Design-Machine is an IBM PC-based CASE tool that automates the requirements and analysis phase of systems development. It automatically generates design deliverables from system requirements recorded in an integrated design database. It has embedded software engineering rules and built-in quality control.

#### KNOWLEDGEWARE, INC.

KnowledgeWare, Inc. provides software tools to automate MIS/DP. The Information Engineering Workbench/Workstation Tools use CASE techniques automating creation, validation, and maintenance of most commonly used planning, analysis and design diagrams. The expert system module validates process and data models against hundreds of structured logic rules, displays diagrams, meetings and stores this in the knowledge-base immediately reflecting changes in any diagram.

#### LANGUAGE TECHNOLOGY

Language Technology provides CASE products in the IBM mainframe market. The company's flagship product, RECOVER is the leading COBOL structuring tool. RECOVER automatically transforms difficult to maintain, unstructured COBOL into structured COBOL in minutes. Language Technology's INSPECTOR is the only quality assurance tool based on scientific measurement of COBOL quality and maintainability.

#### LEARMOUTH & BURCHETT MANAGEMENT SYSTEMS (LMB), INC.

AUTO-MAN-PLUS, the leading edge in CASE technology, provides in-depth solutions for automating software development. Created by LMB, AUTO-MATE PLUS, a PC based tool, provides full support for systems analysis, logical design (including interactive data normalization) and automatic physical design and DDL syntax generation for ADABAS, DB2 and IMS for easy export to the data dictionary. All mouse-driven graphics are enhanced with catalogues.

## Days 2 & 3: Product Presentations

### GUEST SPEAKERS



**KEN ORR**  
Chairman and Chief Scientist  
Ken Orr & Associates, Inc.  
CASE and the Real World



**RICK POTTER**  
General Manager, CASE Division  
Tektronix, Inc.  
CASE Technology for CAE Systems Design



**RON ROSS**  
Editor  
Database Newsletter  
Entity-Modeling: A Fresh Approach  
for Database

#### MANAGER SOFTWARE PRODUCTS (MSP)

MSP is the world's leading vendor of a CASE environment driven of mainframe data and information Resource Management technology. The MANAGER Family of Products (PC and Mainframe) is dedicated to automating all phases of the Systems Life Cycle, from Strategic Information Planning to the generation of enabled code. MSP will be presenting the MANAGER Family of products including managerVIEW, the Intelligent Workstation based graphical Information Engineering tool driven by the Central Knowledge Base resident on the Corporate Dictionary managerVIEW is integrated with the Mainframe Corporate Dictionary and will also run on the IBM PC Family and PS/2.

#### McDONNELL DOUGLAS INFORMATION SYSTEMS GROUP

McDonnell Douglas Information Systems Group is focused on providing single-source solutions representing a tailored framework for software engineering. Prolog WORKBENCH is a new IBM PC-based information system that automates the application of proven structured techniques to the strategic planning, analysis, and design phases of the system life cycle.

#### META SYSTEMS, LTD.

Meta Systems, Ltd. offers integrated micro/mainframe-based productivity (CASE) software, which completely automates the entire process of developing information systems. Our customers include some of the world's most prestigious companies and government, military organizations. They use PS/2, PS/4 (host based), Structured Architect (PC graphics tools), Structured Architect-Integrator (on the host), and other Meta tools to develop large and complex systems, to reverse engineer old code, and to de-enterprise wide data modeling.

#### NASTEC CORP.

Nastec Corporation develops tools for commercial, government, and engineering software developers. CASE 2000 DesignAid is based upon an interactive, multi-user database with features for process modeling, multi-time system modeling and documentation. Operating in the IBM PC and Digital VAX environments, CASE 2000 also includes tools for requirements management, project management and control, and consulting and training in CASE technology.

#### NETRON, INC.

The NETRON/CAP Development Center is a CASE system for building custom, portable COBOL software using a frame-based software engineering process called Basuett Frame Technology. NETRON/CAP unifies the prototyping development/maintenance life cycle into an automated application procedure. The open design architecture allows unlimited automation of additional application functionality for IBM mainframes and PCs, VAX systems and Wang VS minis.

#### ORACLE CORPORATION

SQL\* Design Dictionary is an application written in the RDBMS name ORACLE whose purpose is to assist analysts and designers record the details of an enterprise model (both the data model and functional hierarchy). It generates SQL table definitions automatically and allows for data concentration during each stage of the system development life cycle.

#### PANSOPHC SYSTEMS, INC.

Pansophic Systems, Inc., a leading vendor of software products to improve application productivity and control, will present TELON. The TELON application development system captures design specifications to generate COBOL or PL/I applications. TELON assists the transition from analysis to design by providing interfaces to leading front end analysis tools. TELON components include: Directory, Data Administration, Screen Report Painters, Prototyping, Specification Facilities, Automated Documentation, Generator, and Test Facility.

#### PEAT MARWICK MAIN & CO.

Peat Marwick Main and Company's Catalyst Group will present Structured Retrofit and PATHWU. Structured Retrofit is designed to help you keep up with the ongoing information revolution by automatically retooling software structure. PATHWU is an advanced software product that analyzes program logic and structure, and generates reports in a variety of forms tailored to the needs of each member of the software management team.

#### POLYTRON CORP.

POLYTRON offers the leading configuration management system for IBM (OS/360) and VAX/VMS software development. PVCS maintains versions and revisions of software systems. PolyMaker automatically rebuilds any desired version of the system. PolyLibrarian maintains libraries of reusable object modules. The tools work together or independently with ANY language and your existing tools.

#### PROMOD

Promod supports Data Flow Diagrams and Control Flow Diagrams, Data Dictionary and Control Dictionary, Mini Specs and Control Specs. Promod provides an automatic transformation of analysis data to design. Modular Design is supported using data type design concept with emphasis on Information Hiding and module interfaces. Code Frame Generators utilize data from Modular Design and Pseudocode to set up source code templates in Ada, C, or Pascal for each function.

#### RAND INFORMATION SYSTEMS, INC.

Rand Information Systems, Inc. specializes in productivity and tool management software. We will present the Rand Development Center. We will present the Rand Development Center, a Tools Inventory Management Environment (TIME) with custom tailored workbenches, tool usage tracking and tool integration capabilities. It operates in an MVS/ISPF environment with tool management capability extending across the entire systems development and maintenance life cycle. Developer toolsets support CICS/DB2 and IDMS applications development.

#### SAGE SOFTWARE, INC.

Sage Software, Inc. develops, markets, and supports a family of CASE tools for users of IBM and compatible computers. The company's product family (known as the APS Development Center) encompasses the software development cycle and supports the design, prototype construction, coding, testing, and maintenance of COBOL-based applications software.

#### SOFTLAB, INC.

SoftLab, Inc. will present MAESTRO, the integrated Software Engineering Environment. MAESTRO organizes and manages the software cycle through real-time project management, time accounting, and your unique standards. MAESTRO integrates customizable tools for design, coding, testing, documentation, and maintenance, is language independent, and fits in numerous hardware and software environments.

#### SUN MICRO SYSTEMS, INC.

Sun Microsystems, Inc., a leading supplier of high performance workstations, will speak on CASE solutions to provide greater individual productivity. Sun Microsystems, Inc. will also cover CASE solutions for keeping individual productivity high on large projects in a networked environment.

## Days 2 & 3: Product Presentations

### GUEST SPEAKERS



**MARTIN SPRITZEN**  
President and CEO  
Nautec Corporation  
CASE - Current Status - Future Directions



**JOHN WHITE**  
Vice-President Information Systems  
and Services  
Texas Instruments  
Integrated CASE



**EDWARD YODON**  
Vice-President Planning  
DeVry, Inc.  
Future of CASE Technology

#### SYSCORP INTERNATIONAL

MicroSTEP lets you build a graphical specification, from which it generates executable PC-based business applications. No human programming is needed to generate, compile, and link a complete system, including screen management, relational database interface, error recovery/restart, report writing. Specification requires AT, Hercules, mouse. Application execution requires XT.

#### TECHNOLOGY INFORMATION PRODUCTS

TIP provides completely integrated methodologies and software for systems planning analysis, design, implementation, and maintenance. TIP PLAN helps identify, define, and schedule the systems and data bases needed to meet a business' goals and objectives. TIP DEFINE graphically describes a system's functional and information requirements. TIP RELATE automates building the normalized relational data model. TIP CREATE then generates COBOL/PLI programs.

#### TEKTRONIX, INC.

Tektronix, Inc. has participated in the evolution of the computer-aided software industry for over a decade. Tek already has an established CASE base in the engineering and scientific market sectors, and is currently exploring other opportunities and applications. Tek's family of software development tools is named "Integral CASE Systems Solutions."

### HOW CASE BENEFITS YOU

CASE technology is revolutionizing approaches to software development; you need to know as much as possible about this technology. At this symposium you will learn what CASE technology can do for you. *Past attendees have said that attending CASES has saved them months of frustrating, time-consuming research.*

#### CASE Benefits Include:

1. Giving the MIS management team more control over their projects.
2. Providing an environment that supports your entire development life-cycle process.
3. Freeing your systems analyst by providing automated tools to support the creation of design diagrams, data models, and systems definitions.

#### TELEDYNE BROWN ENGINEERING

TAGA, a comprehensive system software development environment providing for the definition, design, documentation, testing, simulation, and maintenance of complex systems, consists of a system requirements and design language supported by interactive software packages in a distributed workstation environment. TAGS, Technology for the Automated Generation of Systems, is compatible with government and commercial procurement standards and is designed to implement Ada design and code generation.

#### TEXAS INSTRUMENTS

Texas Instruments' integrated CASE product, The Information Engineering Facility, is designed to automate the complete systems development life-cycle. It consists of a powerful mainframe encyclopedia and PC-based, graphical tools to support analysis and design. TI can demonstrate today the major components of this product including strategic planning, analysis, design, COBOL code generation, and database generation.

#### TRANSFORM LOGIC CORPORATION

Transform addresses the development and maintenance of the entire application life cycle. Using expert system technology, complete COBOL applications are produced for IBM mainframe DBMS's DL/I and DB2. The concepts behind automated development, data driven design architecture, prototyping and maintenance are reviewed with examples of user accomplishments.

#### VIASOFT, INC.

VIASOFT, Inc. will present VIA/INSIGHT, the first system to automate research and analysis of COBOL Programs, the most time-consuming part of the continuing development/maintenance lifecycle of mainframe applications. Integrated with IBM's EDITOR, VIA/INSIGHT provides interactive, COBOL-intelligent facilities to isolate data relationships and dependencies, control and logic flow, replacing manual research and analysis techniques.

#### VISUAL SOFTWARE, INC.

Visual Software, Inc. develops and markets an integrated family of personal CASE tools for the multi-user IBM PC and mainframe environments. The VS-Designer is the first CASE workbench to support different methodologies simultaneously from a LAN based information repository. Visual's unique intelligent architecture for Personal Adaptability enables the product to change to user defined methodologies. VS-SQL provides an interface for industry standard interactive queries for analysis and report generation.

#### YODON DIVISION OF DEVRY

The YODON Analysis/Designers' Toolkit supports both the traditional and real-time YODON Techniques and allows for the creation of all the diagrams associated with the techniques. The diagramming facilities of the Toolkit are fully integrated with a powerful dictionary which features database file compatibility. The Toolkit also provides error checking to insure the accuracy of diagrams and dictionary entries.

4. Providing powerful graphical design aids to define and document software systems.
5. Utilizing interactive prototyping techniques to clarify your user requirements and to ensure that developed systems meet user needs.
6. Capturing design information in sufficient detail required for automatic code generation.
7. Verifying and validating functional specifications to detect errors and inconsistencies early in the development life-cycle.
8. Promoting reusability of your software components and other software deliverables.
9. Providing automatic documentation facilities that are continually up-to-date and that are guaranteed to be consistent with your system's specifications.

## TWO WAYS TO REGISTER:

1. Call **617/470-3880** between 9:00 a.m. and 5:00 p.m. Eastern Time
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### REGISTRATION FEES

Individual Fee, Entire 3 Days	\$895
Second	\$495
Third	\$495
Fourth Registration . . . . .	FREE
Film Registration and Over	\$495
Individual Fee, Day One Seminar Only	\$450

**GROUP ATTENDANCE:** Previous attendees have told us that the best way for companies to gain the most benefit from the program is to send two or more attendees. Our discount structure is designed to encourage multiple registrations from the same company. Have you considered sending representatives from different departments, divisions, or locations within your organization?

### RESERVATIONS

A limited block of rooms at a special rate is being held at the hotel until three weeks prior to the symposium. Room reservations and hotel charges are the responsibility of the individual participant. Please register early.

### DIGITAL CONSULTING, INC.

These seminars will be conducted by Digital Consulting, Inc. (DCI), a leader in the field of EDP management training. DCI is located at 6 Windsor Street, Andover, MA 01810, telephone (617) 470-3870.

### IN-HOUSE SEMINARS

We can bring many of our seminars in-house to your company. Our in-house seminars are one of the most cost-effective ways to update your managers and professionals about the leading software technologies. In addition, Dr. Carma McCure is available through DCI for consulting projects. For information, call (617) 470-3870.

### CANCELLATION POLICY

Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of \$100. Transfers to a different Symposium date or substitutions will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium. Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee.

### SPECIAL CASE VIDEOTAPE OFFER \*\*\*\*\*

The CASE Symposium was featured in a recent edition of the *Windows on Wall Street* television series, which highlights emerging opportunities and technologies. Symposium speakers, and a representative selection of the vendors and attendees were interviewed. The show provides a revealing look at the leading-edge technology. Those interested include Dr. George Schussel, Dr. Carma McCure, Dr. Peter Chen, Ron Ross, and James Davey. This 90-minute tape is available from DCI for just \$39.00 prepaid. To order your copy, send \$39.00 to: Digital Consulting, Inc., 6 Windsor Street, Andover, MA 01810. All orders must be prepaid.

## HOTEL INFORMATION

### Toronto, January 19-21 Inn on the Park



The Inn on the Park features five restaurants and lounges, a wide array of recreational facilities including indoor and outdoor pools, a health club, racquetball, squash and tennis courts, and 14 fabulous boutiques. The Inn on the Park is located at 1100 Eglinton Ave. East, Toronto, Ontario Canada, M4C 1H8 (416) 444-2564.



### Atlanta, February 22-24 Hyatt Regency Ravinia

Located in Atlanta's prime Dunwoody sector, the Hyatt Regency Ravinia features fine dining restaurants, a health club featuring an indoor pool and fitness center. The Hyatt Regency Ravinia is located at 4355 Ashford-Dunwoody, Atlanta, GA 30346. (404) 395-1234.



### Boston, April 25-27 Sheraton Boston Hotel and Towers

Located in the heart of Boston's famous Back Bay, the Sheraton Hotel and Towers features award winning restaurants, an informal cafe, the largest pool in Boston, and a view of Boston's skyline from your room. The Sheraton Boston Hotel and Towers is located at 39 Dutton Street, Boston, MA 02199. (617) 226-2000.

## REGISTRATION FORM

### TELEPHONE REGISTRATION (617) 470-3880

- Call 9 a.m. - 5 p.m. Eastern Time  
☐ Confirms telephone registration

### METHOD OF PAYMENT

- ☐ Check enclosed. Make checks payable to Digital Consulting, Inc.  
☐ Purchase Order attached  
☐ Bill my firm Attn. of \_\_\_\_\_ ☐ Authorized Documents enclosed

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### Computer-Aided Software Engineering Symposium

- ☐ 1077, Toronto, January 19-21  
☐ 1078, Atlanta, February 22-24  
☐ 1079, Boston, April 25-27  
☐ Single Full 3-day @ \$895 ☐ Day One Only @ \$450  
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☐ YES, I want the CASE videotape @ \$39.00 prepaid.

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## Computerworld Forecast '88

ISSUE DATE: JANUARY 4—CLOSE: December 11

Computerworld's **Forecast '88** puts you in touch with an audience of information systems professionals who are concerned about the future. Professionals who want to know how today's trends and technology will change — and impact their information systems in the coming year.

Computerworld's **Forecast '88** issue ties it all together in a comprehensive look at how next year's microcomputing, communications, mainframe computing and MIS products and services are shaping up for 1988.

Computerworld's **Forecast '88** examines the issues that are affecting today's information systems — and looks at how they will evolve and change next year's trends and overall market. Planned topics include:

- Outlook for MVS-XB, VMS v.5 and VM.
- Strategic planning for micros.
- Planning tomorrow's networked enterprise systems.
- Survey results of 100 MIS professionals' capital spending/buying plans.
- Vendor outlook on the cloning of PS/2.
- MIS migration toward OS/2.

This special edition, published as a combined December 28 and January 4 issue, delivers an important look at what today's trends will mean tomorrow. There's no better opportunity to reach the MIS, microcomputing and communications professionals who will generate your biggest 1988 sales.

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## COMPUTERWORLD

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Ross Systems is bigger in  
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# Collective force: Tools for group productivity

BY PATRICIA SEYBOLD

**A** new wave of application software, designed to enhance the effectiveness of people working together, is about to hit the corporate computing market. The era of enhanced personal productivity is drawing to a close; group productivity is in. Corporations need tools that facilitate teamwork because the complexities of the business environ-

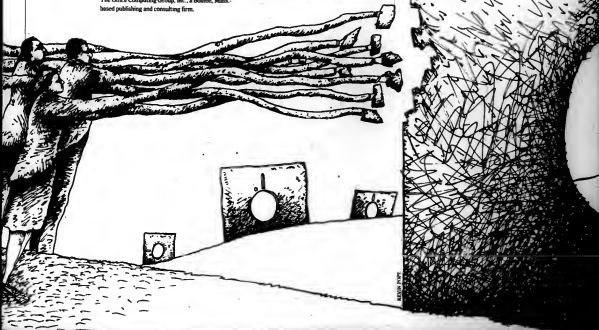
ment pose challenges that are beyond the grasp of even brilliant individuals. Only by pooling resources and combining different views of reality can businesses meet complex challenges with variety and flexibility.

Computer software and system designers were among the first to notice the need for tools to support cooperation. They recognized the requirement from

their bitter experiences of trying to develop products and bring them to market on time, within budget and as specified.

What these computer designers learned is that the existing tools they use—networked computers, electronic mail, electronic calendars, scheduling systems and even project management software—don't help reduce the complexity of working together. New tools are needed that will support and augment the collaborative process. These offerings should be

Seybold is president and chief executive officer of The Office Computing Group, Inc., a Boston, Mass.-based publishing and consulting firm.



able to streamline effective communication; support collaborative research; foster the cooperative creation of documents, specifications and code; facilitate brainstorming; provide ways to alert all team members to changes; and automate processes and procedures involving more than one person.

#### Proactive applications

Cooperative applications are not passive but proactive. Examples of such applications include self-updating project management software, electronic mail that tracks commitments, shared data bases that let you know when something that affects or interests you has changed and automated assistants — software agents

or robots in the network that take action based on conditions they've been alerted to observe.

Once implemented, a cooperative application improves the ability of individuals to work together, turning their network into an environment that supports streamlined operations and communications. The following are some examples of cooperative software on the market:

- **The Coordinator.** Emeryville, Calif.-based Action Technologies, Inc. produces a cooperative program called the Coordinator. The Coordinator goes beyond electronic mail communications by providing a framework in which communications are divided into several major categories — communications for action or commu-

nications for possibilities. Users of the system are encouraged to declare a domain for each type of communications in which they engage.

The point of the Coordinator is to keep users from being sloppy in their communication. If a user wants something done, he needs to specify it as a communication for action, making a proper request, including specifying the conditions of fulfillment. Someone who receives such a request has the option of accepting the request as stated and, thereby, making a commitment; asking for a clarification; making a counteroffer; or denying the request. The software assists in this process in two ways. First, it structures the communication among individuals so it is more

effective. Second, it tracks the commitments each individual makes and the promises he receives.

However, the Coordinator may have a problem with gaining broad-based acceptance. The terminology the program uses is foreign to most users, and the user interface is said to be confusing and not self-evident. Also, the program is not cooperative in the sense that it will run around the system to see if people have kept their commitments. Instead, users have to notify one another about their progress in making or breaking commitments.

- **Context Corp.'s Doc.** Another example of cooperative software is Context's technical documentation software, Doc. Context, in Beaverton, Ore., is a 2-year-old spin-off and subsidiary of Mentor Graphics, a computer-aided engineering product vendor whose systems are based on Apollo Computer, Inc.'s Domain architecture. Doc takes advantage of the Apollo networking platform and offers a distributed document data base.

For example, different people can be working on different parts of a document simultaneously across the network, yet the document appears to each as if it were a single file in one location.

In the Context software, drawings, whether they are illustrations, scanned images or computer-aided design and manufacturing files, can be created and edited independently of the document.

Doc also provides the notion of a master document with links to other versions of the document, such as different revision levels and versions for different countries or customers. The writers and editors can make changes to the master version, and then the relevant linked files are updated.


Authors and engineers can propose changes to the document. These notations show up in different colors with proposed deletions struck out. A status display shows who made each set of changes. Annotations are stamped with the date and time. An editor can track an entire set of changes or proposed changes and then edit in yet another color, accepting or rejecting some or all changes. Each version of the document is retained as a separate, unique view of the document history.

This cooperative application is ideally suited for the process of engineering change control because engineers can propose changes to the documentation of a product or to a repair manual. In preparing for an engineering review of each version of the documentation, an editor can look at all the similarities and conflicts. Once changes are approved, the final version is frozen, but all previous recommendations and annotations are retained.

- **Other cooperative software.** Another application that should emerge given the tools and environments that are coming to market includes project management software. Project management software will actually track the progress of development across a networked system and automatically update the schedule based on predefined conditions.

Distributed or local data base applications in which users can profile their areas of concern or interest are also a type of cooperative software. Intelligent data base software alerts the user if and when certain information arrived or certain conditions were met.

Once the developer or end user can define a particular procedure or data set as an object that has certain attributes and



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permits certain operations to be performed once it, then he has the necessary flexibility to begin to create cooperative software.

The next wave of cooperative applications will be implemented primarily on networked personal computers and workstations. The more elegant the networking software environment, the better the applications are likely to be.

Apollo's Network Computing System or Digital Equipment Corp.'s proposed decision support system will provide excellent environments for cooperative software to flourish. But simpler networking schemes, such as Microsoft Corp.'s MS-Net, do not preclude the support of cooperative applications.

A few minicomputer-based integrated office systems will join the cooperative fray as well, offering the advantages of multiuser environments: existing utilities and services, such as electronic mail, calendaring, scheduling and communications; and forms processing features, such as those in Motorola Computer Systems, Inc.'s Linked Information Environment (Life) product.

Similarly, PCs networked together via a micro-to-mainframe connection offer a visible envi-

ronment for cooperative applications.

The simplest tools with which to design cooperative applications are cross-application macro languages. As soon as users can create macros within one application that rely on events that

which can link to any other Hypercard application (stack) or subroutine (button).

Most of the Hypercard-developed applications have been single user, but multiuser Hypercard programs are expected when Apple enhances its Appli-

**A cooperative application improves the ability of individuals to work together, turning their network into an environment that supports streamlined operations and communications.**

occur within another application (in the same machine or on the network) to trigger a future automatic action, they have the foundation for a cooperative application. These cross-application macro facilities are just beginning to emerge on the marketplace from such vendors as Apple Computer, Inc., Microsoft and Hewlett-Packard Co.

Apple's cross-application macro facility in its HyperTalk language, which takes advantage of the Hypercard applications development environment, now shipped with every Apple Macintosh. End users and third-party programmers are likely to use the Hypercard paradigm to develop new applications, each of

talk networking software.

Microsoft has announced that it will offer a cross-application macro facility as an adjunct to its MS OS/2 environment. The company's current PC/Excel product offers a preview of the MS OS/2 facility. Excel allows an end user to store macros by executing a series of operations in Learn mode. Next, the user can display the macro commands and edit them, adding conditional statements. The macro commands are expressed in a Basic-like format. So, although the end user does not have to master Basic programming to write routines that bridge applications, a Basic programmer would feel right at home adding in addition-

al sophistication.

HP's New Wave integrating environment is another cooperative software program. Like HyperTalk, New Wave offers the end user and developer an object-oriented macro facility that enables him to create assistants, or subroutines, that will run from program to program and from machine to machine in the network.

This type of macro can act upon such objects as data files, programs, subroutines within programs and any series of operations a user performs and saves.

Of course, in order for a user or developer to program automated, conditional procedures across applications, software companies must agree to write their programs to take advantage of the integrating environment. HP's New Wave environment offers immediate capabilities for cross-application assistants among HP's word processor, spreadsheet, business graphics and data base.

But integrating a different spreadsheet into the routine would only be possible if the developer of the spreadsheet application had written it or modified it to conform to HP's object-oriented environment. (By the time HP announced New Wave, it had

lined up a number of leading software suppliers that had agreed to implement the New Wave architecture.)

The same requirement holds true for Microsoft, Apple and any other supplier of end-user customizable environments. The difficulty is that customers want both the intimacy and tight integration that are available from applications that play by the same rules and the freedom to choose any off-the-shelf application.

More elaborate tools for the development of cooperative applications, and ones that do not require cooperation on the part of major software developers include Expert's Factory from Cambridge, Mass.-based Software Microsystems Corp. and Proteo from Markham, Ont.-based Proteo Technology Corp.

#### Going for brokers

Both products are targeted for the professional programmer in the corporate environment who wants to create a custom workstation application, such as that found in a broker's or insurance agent's workstation.

Proteo's tool set is well-suited to the development of cooperative applications. Proteo-developed applications can function on

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Novell, Inc., 3Com Corp. and Banyan Systems, Inc. local-area networks as well as leverage programs distributed across IBM VM-based hosts and PCs. The next Proteo implementation will reportedly include software that bridges the DEC VMS environment, Unix operating system and IBM MVS hosts.

Proteo's development environment currently leverages Santa Monica, Calif.-based Quarterdeck Office Systems Co.'s Desview to provide pseudo multitasking for IBM Personal Computer AT users. Proteo says IBM OS/2 support is coming.

Like HP, Proteo adds an object-oriented architecture to its product. Objects can be programs, robots (subroutines that run between programs or among users), par-

ticular views of data or data types. Digitized voice or video clips can also function as objects.

Objects are grouped into types. Each type definition describes up to 15 generic operations or interfaces that are relevant for that object type.

#### Not always straightforward

Unfortunately, the development of procedures, including robots, across applications is not as straightforward in the Proteo environment as it is in the HP, Microsoft and Apple worlds. Proteo developers use a Pascal-like procedural language that is not as simple as the point, poke and "watch-me" mechanisms found on the new platforms.

Another route that seems to be available for the development of cooperative applications is a forms-based paradigm. Berkeley, Calif.-based FCMC's Staffware is a procedural automation tool kit designed for networked PCs or mini-micro systems.

It enables users either to create forms that mirror existing paper forms to be filled out and routed around a work group or to create new forms. These forms applications then become live in that they can be filled with conditional instructions such as, "If the total exceeds \$5,000, then route to purchasing for approval; if not, send to the manager for his initials. If he is not available, alert me."

Motorola Computer Systems in Cu-

pertino, Calif., has taken another forms-based approach. The company has been gearing up for a Unix push into the general office market with the introduction of its Unix-based 8000 processors. Motorola analyzed its role in this quickly evolving market and concluded that software is key to the successful implementation of work group computing and that current horizontal software does not augment the way groups function.

These are not particularly radical thoughts. But Motorola reportedly explored the ramifications thoroughly, even writing the first in a series of white papers on the nature of work group computing. The result of this planning made its debut at the Info show in September when the company announced its Life product.

Motorola's Life provides the now-standard complement of office tools but adds more. The Life Forms application brings to market an intelligent form processor that provides procedural automation beyond the capabilities of any available package.

Life Forms is a dynamically self-adjusting forms-management system that uses embedded rules. For example, one of the features of Life Forms enables a user to scan in existing forms and make them "intelligent." Imagine an on-line income tax form that presented a user with only the fields and supplemental forms he needed, as determined by entries made earlier. That is the type of power Life Forms provides.

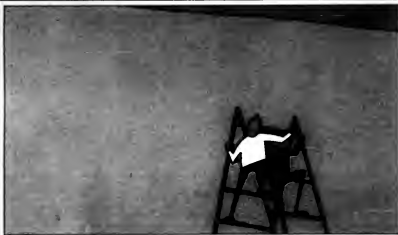
#### There's more to Life

Life Works is a data capture and transaction-processing package for work groups that draws on Motorola's experience with Vision, an early operating system from the now-defunct Motorola/Four-Phase Systems, Inc. Life's E-mail component, called Life Lines, keeps the forms "alive" as it passes them across the system. A tracking feature keeps a log of all mail moving through the system, providing a safety net to keep information from falling through the cracks. A third piece, Life Plans, is a spreadsheet and graph tool designed to analyze the data input from Life Forms as well as Life Works.

The Life packages seem ahead of the competition in providing a sophisticated way to deal with structured, corporate information. However, if Motorola added some extra automatic routing and triggering functions, the company would move well out onto the leading edge of procedural automation toward true cooperative software.

Motorola's Life software should drive the company's sales. In addition to launching an aggressive advertising campaign, Motorola is also taking a realistic approach with potential customers. Potential buyers have free use of a Life system for 30 days. If they decide not to buy, the company will take the system out, without obligation or charge.

In the next several months, the tools and environments that will enable the development of cooperative applications will arrive. By the end of 1988 and, certainly, by 1989, users will have a variety of desirable cooperative applications to run on the computing platforms they already have in place. And even more exciting, users will have tools to create their own, customized cooperative software to address the needs of the staff in their organizations that need support in working together more effectively. ♦



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# The success of C

## *Programmers' pet language grows up*

BY STAN KOLODZIEJ

**C** is a star. Long a hot programming commodity in the microcomputer field, C is also gaining support in certain areas of mainframe programming. Programmers love C. The language is often referred to as a "programmer's language," a language that gets into the guts of a machine, fitting a system's hardware like a glove. "C has expressive power not found in other languages," says Terence M. Colligan, president of Rational Systems, Inc., the Natick, Mass., developer of Instant-C, a C programming compiler. "Pro-

grammers can open up with C."

Software developers like C. Part of C's popularity rests in its ability to work on a variety of machines. Developers can use C to write programs that can hum on a particular system but are flexible enough to be ported to run on other system architectures — without giving programmers hernias in the process.

Doug Baer, senior product manager for Digital Equipment Corp. VAX systems software at Cincinnati-based Cincom Systems, Inc., praises the programming control C offers. Baer adds that all new software development on VAX systems at Cincom is now done in C.

"C covers a lot of programming ground," says Bruce Lynch, president of The Programmer's Shop, a software development and consulting group based in Hingham, Mass. "For strict software performance, the ultimate is the assembler language, but assembler is poor in productivity performance."

Kolodziej is Computerworld/Pascal's senior editor.



"At the opposite end of the spectrum is Basic, a language that provides good programmer productivity but does not yield good program performance. C is not the best language for programmer or program productivity, but it's strong in both areas," Lynch explains. "That's the strength of C."

C is a tightly knit language. Colligan attributes this quality to the fact that most of the people who started building C compilers worked at AT&T Bell Laboratories and worked closely with their specific computer systems to get results for specific problems. The result, Colligan explains, is a good fit between C and machine.

"Pascal and Modula programming languages, on the other hand, were designed by computer scientists and not for specific applications," Colligan says. "It's more of an abstract relationship."

Nevertheless, C has benefited from its share of good timing. For example, Colligan, who thinks highly of the Modula language, says that if Modula had come into the market at the

same time as C, Modula, not C, would now be the micro programming language of choice.

"What happened instead is that when personal computers stormed into corporate offices, C already had a reputation for portability and a good, proven base of compilers," Colligan explains. "The others couldn't catch up."

C's success isn't entirely in

the micro and minicomputer fields, however. Lynch and others say there is a slow transition under way in accepting C in the mainframe environment.

IBM is apparently going to be speeding up that transition. IBM has chosen C, along with Fortran and Cobol, as the three IBM-sanctioned languages within IBM's Systems Application Ar-

chitecture (SAA), a long-range communications project aimed at producing common application and programming interfaces among three pivotal IBM systems platforms: the 370, the System/36 and 38 and the Personal System/2 micro line.

And that's not all, according to Tom Wilcott, senior vice-president of technical services at

International Data Corp. (IDC), a Framingham, Mass.-based research firm.

Wilcott predicts that IBM's "Silverlake" machine, the apparent replacement system for the System/36 that is still under development wraps at IBM, will run C. He also suggests that Cambridge, Mass.-based Lotus Development Corp. will be using

C as an integral part of its mainframe software push now that IBM has excluded assembler from SAA.

"IBM is not simply paying lip service to C," claims Paul Cabbage, associate director of Unix services at Datagroup, Inc. in San Jose, Calif. "C is at the center of IBM's strategy to standardize on the most important programming standards within SAA."

Software developer SAS Institute, Inc. felt strongly enough about C in the mainframe world to acquire Lattice, Inc. and its C compiler products late in 1986. SAS says it is using the Lattice purchase as a way of controlling and keeping closer to the development of C compilers across SAS micro and mainframe software lines, instead of relying on third-party software developers.

"C is an important tool in the micro and mainframe environments," explains Oliver Bradley, director of C compiler development at SAS. "Most of our mainframe customers have declared they will use C for generating new program code."

In fact, Lynch of The Programmer's Shop claims C is usurping the role of PL/I as the second language of choice after assembler in large-systems engineering houses.

Lynch also sees more products that convert other languages to C, such as Fortrix-C from Suffern, N.Y.-based Raptitech Systems, Inc., now coming into the market. Vendors are also increasingly integrating C with other languages, such as Seattle-based Intellicorp, Inc.'s merger between C and its LISP-based Knowledge Engineering Environment system.

#### A nice niche

"C has found a niche between assembler and high-level programming languages because C has the ability to be modular in code and stresses user-defined formats," explains Dan Woods, product manager at Gari Software Associates, Inc., a consulting firm based in Roseland, N.J.

"The fact that IBM has adopted C in its MVS and VM environments will be a big boost for C in mainstream large systems development. In fact, the only remaining (MIS) resistance to C is in these IBM mainframe shops," Woods adds.

But that can be a big chunk of resistance in a very big market. There are many who say that C is by its nature limited in the mainframe application area.

Ed Acly, program manager of software technology services at IDC, says that C will always be a technic language, shunned by mainstream MIS. "C will do well in the scientific and technical programming installations," Acly reasons, "but it will find a big wall in the [mainframe] commercial field."

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By "commercial." *Acly* means IBM, mainframes and Cobol. *C* follows a well-traveled path strewn with computer languages that have failed to dialogue or even live amicably with Cobol in the mainstream commercial environment. Just how far *C* can penetrate this market is a question that is sparking a heated debate.

"C is too detailed a language for MIS," *Acly* explains. "I doubt if *C* will replace Cobol or even approach it in popularity."

Not so, says Rational System's Colligan. "What we've seen in the past several months is an increased interest in *C* by large mainframe commercial software developers such as McCormack & Dodge Corp. and others. They're approaching us; we're not approaching them."

Cabbage suggests that, as a language, Cobol is verbose; however, it is good at handling numerical applications, something in which *C* differs.

The *C* language itself is pretty sparse; in fact, it's the opposite of Cobol. "Cabbage" says. "And you can't really use *C* without also buying the C library of tools. Besides, the Cobol 74 [standard] is still one of the most flexible programming products around."

Cincom's Baer adds that there is simply too big an installed base of Cobol programmers in the U.S. for *C* to budge. He says that the training and maintenance costs of shifting to *C* would be too high a price for MIS to pay.

"Most commercial environments want applications up quickly, and they couldn't do that with *C*," Baer explains. "They resort instead to Cobol and possibly even to fourth-generation languages — not *C*."

That's certainly the case at Sandia National Laboratories, a telecommunications research facility located in Albuquerque, N.M.

"We have an interest in *C* on our scientific side," explains Merle J. Benson, a Sandia technical staff member. "That area uses assembler and Fortran. But our administrative side is strictly Cobol, and we don't see that changing in the short term."

However, according to Doug Flower, a consultant based in Brookline, Mass., "There is a whole class of commercial and scientific programs that might be better written in *C* instead of in Fortran and Cobol. Unlike *C*, it's very hard to write programs in these other languages. I really think Cobol will start fading, and you will see more combinations of *C* and fourth-generation languages being used."

Furthermore, putting faith in Cobol's numbers might not be entirely wise. Dataquest's Cabbage, for example, points to the growing supply of *C* programmers graduating from U.S. colleges.

#### 150,000 strong

According to Jeff Weiner, former publications specialist at Sandy Hook, Conn.-based software developer Productivity Products International, Inc., a recent study by the firm indicated that as many as 150,000 *C* programmers may now be working in the U.S. Weiner extrapolates that many thousands more would at least be familiar with the language.

While *C* has a lot of selling ahead in the large commercial systems field, the language virtually sells itself in the micro-computer market.

Once identified almost exclusively with the Unix operating system, *C* continues to wear itself from Unix and to become a distinct marketing force in its

### ***C* follows a well-traveled path strewn with computer languages that have failed to dialogue or even live amicably with Cobol in the mainstream commercial environment.**

own right.

*Acly* says *C* is what makes Unix portable. "Unix itself isn't portable. *C* was invented to make Unix flexible," *Acly* explains. "Maybe *C* is far more important than Unix."

Maybe so. Lynch reports that of the more than 100 add-in products he has identified that are available for the Microsoft Corp. *C* Optimizing Compiler, only a handful deal with extending the features of Unix.

Colligan suggests that *C* has simply reached critical mass in the micro market and adds that he is unaware of any *PC* programmers not currently working with *C*. "I think there are almost 30 different *PC* vendors with *C* compilers out there," he says. "That number just keeps growing."

And many of those compilers support the two top-selling micro *C* programming environments: the Microsoft *C* Optimizing Compiler and the recently introduced Turbo *C* from Scotts Valley, Calif.-based

Borland International, Inc.

This past summer, Microsoft introduced QuickC for the novice programmer and the Microsoft *C* Optimizing Compiler 5.0 for professional *C* programmers. QuickC comes either bundled with Microsoft *C* Version 5.0 or can be bought separately.

Microsoft may have put micro *C* compilers on the map, but a lot of eyes are still turned to Borland.

Borland's Turbo *C* has done great things for the *C* market — if only on price alone. Lynch claims. Turbo *C*'s \$99 price tag means that almost any programmer can go out and buy the product on his own. When *C* programming systems were several hundreds of dollars, buying one

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— Phil Thomas  
Thomas Business Systems



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was considered a corporate purchase, with corporate permission needed.

Though Microsoft is billing QuickC, which is also listed at just under \$100, as a direct price and performance competitor to Turbo C, Flower has worked extensively with Microsoft C and Turbo C and has drawn conclusions on the strengths of both in

relation to the four phases of C programming: editing, compiling, linking and debugging.

#### Good giving job

"Borland handles the compiling and linking stages very well," Flower says. "It also did a good job of giving its user interface to the compiler. But the company falls down on the editing and de-

bugging phases."

Flower says, in fact, that Turbo C doesn't have a real debugger. "The first phase of getting out bugs, the syntax checking phase, is no problem with Turbo C," Flower says. "It's during the next debugging phase, when you go over the logic of what the programmer has just done, that Turbo C breaks down."

Flower is quick to add, however, that Turbo C is not bucking a trend. The standard in the C compiler market in the past has been to exclude debugging features from compilers, prompting a small subindustry of companies that provide separate C debuggers. Microsoft, however, was the first firm to provide a compiler and debugger in one system.

"Again, Microsoft, like Borland, has done a good job of gluing various parts of the programming environment together," Flower says. "But there's a trade-off. With Microsoft, you'll need the QuickC compiler and the full version of Microsoft C to do complete C programming, and that will cost about \$500."

With Turbo C, Flower says, programmers can deliver their final system programming for \$100, but it will be slower because of debugging problems.

In November, Borland announced Turbo C Version 1.5, an upgrade that carries built-in graphics functions. This move is a direct answer to Microsoft's criticism that Turbo C lacks such functions.

Borland still has not introduced a debugger; however, it has intimated it will announce a separate, stand-alone debugger as early as the first quarter of 1988.

In the meantime, both Borland and Microsoft could get some stiff competition from low-priced C programming systems now coming on the market, such as C Function Library, a \$99 package from Sterling Castle, Inc. in Marina Del Rey, Calif., and Optimus C Compiler, a \$139 product from Datalight in Kenmore, Wash.

#### The most for the money

For Flower's money, however, Rational Systems' Instant-C represents the kind of integrated C programming environment that a company needs. At \$500, the product is worth the extra expense, he claims.

"Instead of giving separate components together, Rational has rethought the entire C programming process and come out with a fluid, tightly defined system," Flower explains.

"In the next five to 10 years, it won't be the languages but the computing environment that will dictate what the programmers use," Colligan says. "The entire process is geared toward making compilers do more than just list programming errors."

In the meantime, however, C will get a lot of mileage and a ready market in the Apple Computer, Inc. Macintosh line, which is making important inroads into corporate microcomputing.

Apple's Mac C, the first Macintosh compiler, is now in Release 5.0, and several other C compilers, such as Lightspeed C from Bedford, Mass.-based Think Technologies, Inc. and Hyper-C from Tucson, Ariz.-based Spectra Micro Development, are picking more C programming features into packages for less than \$200.

"I think these companies will find a whole new market out there," Cincom's Beer says. "I think a lot of people will want to become literate in C. There's a big market to be tapped." ♦

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## TECH TALK

### Ada's rising stature to give Cobol a run for its money

By MICHAEL TUCKER

As we enter 1988, Cobol continues to be the language of choice for the vast majority of MIS applications. It is one of the longest lived of all software development environments. Operating systems have come and gone, programmers' editors and tools have risen and fallen, and other languages have flowered and perished.

Yet Cobol endures. It has weathered the assaults of newer tongues, the contempt of whole generations of programmers and the appearance of fourth-generation languages promising vastly superior productivity.

Why Cobol has had such spectacular staying power will probably only be decided by future historians, though, of course, theories are already available on practically any street corner. Perhaps there is something in the argument that Cobol endures solely because commercial, MIS-oriented programmers tend to be a conservative bunch.

With tool set rollouts, Ada is becoming more accessible than ever to MIS.

Personally, I think there's something deeper to Cobol's endurance than that. I wonder if the language has powers not generally considered by its critics. Cobol's ability to handle huge lists, after all, makes it more, not less, like the prototypical artificial intelligence language, LISP. (And come to think of it, LISP was developed at about the same time as Cobol for some of the same purposes.)

In any case, Cobol's record is surely unmatched in modern computing. Perhaps only Fortran—the language that is to scientists and engineers what Cobol is to MIS—has a similar record. But even Fortran has begun to wear around the edges; the generation of scientific and engineering programmers that came on-line in the 1960s cut its teeth on C. To these programmers, Fortran is only of historical interest.

Perhaps more sinister to Fortran's fate is Ada, the lan-

guage developed by the U.S. government and mandated as the standard for military and federal software in the future. Admittedly, that future seems to grow more distant with each passing day, but, for Fortran, the precedent is not good.

Ada also has its sights set on Cobol. Here, though, the sides are more evenly matched. Where Fortran held its power base among programmers that could be swayed by government mandates, Cobol is a commercial language under the influence of no one central authority.

#### On the offensive

Still, two recent product announcements hint that Ada could truly make a dent in Cobol's armor. First, on Oct. 7, Cadre Technologies, Inc. in Providence, R.I., and General Electric Co. in Schenectady, N.Y., revealed an agreement whereby Cadre would market a series of Ada programming tools originally developed by GE.

Cadre is well known as the developer of the Teamwork group of computer-aided software engineering (CASE) products that runs on tightly networked engineering workstations. The Teamwork products are used mostly by systems analysts and mostly for large-scale scientific and engineering software development projects. The government, naturally, is a major market for most of Cadre's customers, so it was only to be expected that Cadre eventually would get into Ada.

GE, in turn, developed its tool set for internal use. The firm didn't have much interest in marketing the tools nor did it have Cadre's channels of distribution for CASE products. A joint venture with a vendor like Cadre was inevitable.

The tools, which will be integrated with Teamwork, include such elements as a graphics-based Ada design editor, a syntax-directed editor, an Ada interpreter and, most importantly, an Ada code generator.

You cannot yet buy the product from Cadre because, at the moment, it is in a curious limbo. Ada has many strengths, but it is also fantastically complex. So GE developed its Ada

Continued on page 45

## PRODUCT CLOSE-UP

### An eye on your expenses

Jetting to New York for a business meeting and staying overnight? Having a late lunch with a potential client? Entertaining visiting dignitaries? There is a product out now that reportedly enables you to carry on with your business plans while you keep an eye on streamlining your expenses.

Capture, from Dallas-based American Airlines, is a comprehensive management system for travel and entertainment expenses, an area that is considered to be the third most controllable cost in corporations after salaries and data processing, said Jennie Thompson-Smith, president of Topes Enterprises, Inc., a Portland, Ore., travel consulting and auditing firm.

"A lot of vendors provide little bits and pieces to handle travel

expenses, but they don't address the whole picture," Thompson-Smith explained.

Capture, which was written with Informix Corp.'s Informix SQL, was designed to handle pretrip, posttrip and historical data that resides in a corporation's information system.

Using this data, the software product automatically compares travel plans with the company's travel policy and tax laws regarding travel and expense deductions.

For example, because of certain tax law changes, business meals that were once covered 100% are now only covered 80%. Capture reportedly allocates these deductions automatically. A company can then use

Continued on page 47

BLUE  
BEAT

## The million mark

Deidre Depke

There's no doubt that 1987 was a year of catastrophic change for IBM. The company spent much of the last 12 months revamping the most basic components of its business. It upgraded its entire product line, altered its corporate structure and tried to move closer to its customers.

These changes were designed to make IBM more competitive, allowing it to regain a position of unchallenged industry dominance while increasing its profitability.

Most of these changes benefited IBM's MIS customers. For instance, IBM was more forthcoming in future product information. Sales representatives became more responsive to customer questions. Enhancements and new product lines improved

customer productivity.

But one of IBM's most dramatic changes has actually made life harder on MIS—IBM's decision to try to shore up its competitive position in the low-end with its Personal System/2 technology.

By abandoning its Personal Computer technology and product line in favor of the PS/2's hardware technology and operating system, the company asked its customers to alter significantly their own personal computer acquisition plans.

Suddenly, MIS was faced with a product line from IBM that didn't seem to fit into the computer structure already in place.

It required new versions of applications software, a new training effort for users and a

Continued on page 47

## Cobol maintenance relief

Automating logical analysis gives programmers a hand

Maintaining mainframe Cobol programs can be a time-consuming and frustrating chore for programmers. A Phoenix firm, however, hopes to spell relief with Via/Insight, which reportedly automates the logical analysis of Cobol programs.

Viasoft, Inc. and its Via/Insight Release 3.0 is transparently integrated into IBM's ISPF Editor, obviating the need for users to leave the editor to perform logic analysis and return later to the editor to

make program changes.

The vendor added that programmers previously carried out important analysis functions, such as researching data relationships and control flow, by manually examining thousands of lines of code.

According to Viasoft President and Chief Executive Officer Kent Petzold, Release 3.0 contains an editor with the intelligence to understand the Cobol language. This enables programmers to estimate,

research, implement and verify the accuracy of Cobol modifications within the same edit session.

"One of Release 3.0's benefits is its ability to adapt to a programmer's work habits," Petzold said.

### Targets many markets

Apparently there are many programmers to which the product can adapt, especially in the software maintenance field. Viasoft estimated, for example, that there are 20,000 mainframe sites worldwide, with key Viasoft target markets in the energy, banking, insurance, transportation and telecommunications areas.

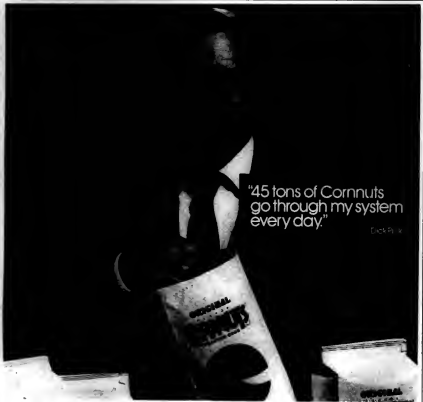
Petzold also pointed to what he said is a 1987 mainframe systems software

growth rate of 20%. "We've found that from 60% to 80% of the typical [system] programming budget is spent on software maintenance," Petzold claimed. "That is almost a complete reversal from the early years of programming when about 70% of budgets were spent on new applications and only 30% on maintenance."

In the meantime, Cobol has no intention of fading away. With an estimated 70 billion lines of existing program code written in Cobol and what Viasoft estimated as a \$2.3 trillion investment in Cobol in corporate America, Petzold is probably right in calling Cobol the universal computer language.

Via/Insight Release 3.0 runs on any IBM mainframe or plug-compatible using ISPF/PDF 2.0 and higher under the IBM MVS and MVS/XA operating systems. The product costs between \$45,000 and \$69,000, depending on CPU size and configuration. — STAN KOLODZIEJ

Circle Reader Service Number 171



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## Tool runs 1-2-3 applications without 1-2-3

BY MARY CHAVES  
SPECIAL TO CW FOCUS

@Liberty, a program from Manchester, N.H.-based Soflogic Solutions, Inc., is proving itself to be "the little train that could." Released at summer's end, @Liberty is an applications development tool that should be classified as a spreadsheet compiler.

@Liberty lets Lotus Development Corp.'s 1-2-3 applications run without the original \$495 1-2-3 spreadsheet. With @Liberty, the user runs only the compiled version of Lotus's 1-2-3.

In-house 1-2-3 gurus, information center personnel and software developers are likely to benefit most from Soflogic's program.

The product guarantees the integrity of the developed application because an @Liberty-compiled spreadsheet cannot be changed, Soflogic claims. This feature allows for the standardization of spreadsheet work either in departments or throughout the company.

@Liberty does not display underlying cell contents. Proprietary data, formulas and macros can be incorporated within the spreadsheet, thus protecting sensitive data because users cannot see those items while the program uses them.

Like compilers for Ashton-Tate Corp.'s dBase, @Liberty enables users to create and distribute executable spreadsheet applications that can be run without the original spreadsheet program. It separates the tasks of spreadsheet building and spreadsheet using. Developers can create a spreadsheet application or template using a spreadsheet program, including Lotus 1-2-3 and Symphony, Microsoft Corp. Multiplan or Computer Associates International, Inc. Supercalc4, and distribute executable, runtime files. End users then run the @Liberty-compiled spreadsheet to enter and modify specified data and calculate results.

Continued on page 45

## Tech Talk

Continued from page 43

tools on a symbolic processor. Part of the agreement is that the two companies will cooperate on transferring the tools to the conventional workstations on which Teamwork runs.

Meanwhile, across the continent in Mountain View, Calif., Pyramid Technology Corp. introduced its own Ada Development System (ADS). Meant to run across the entire line of Pyramid Unix-based systems, ADS consists of an Ada compiler, a screen-oriented debugger, a library management software and program-generation utilities. Depending on the hardware, the cost of ADS ranges from \$20,000 to \$50,000.

At first and even second glance, these Ada developments appear as though they have little to do with MIS. Here we have three companies, all of which deal in the technical/government market, displaying products that will aid scientists and engineers. That's about as far removed from the real-world concerns of data processing professionals as one can get.

## Out of the esoteric

There still could be an impact. The underlying theme of the Cobol/ICE agreement is that Ada is slipping out of the rarified realms of symbolic processors and esoteric applications and into the areas in which MIS can use it. The importance of the Ada tool set, particularly now that it is associated with Teamwork, is that Ada will be a much, much easier language in which to work. For the MIS officer who needs to develop in Ada, the entry cost in terms of programmer training and experience has just radically dropped.

The Pyramid announcement is also significant. Pyramid has recently become one of the numberless Unix box vendors to make a serious attempt to get into commercial DP. In September, it announced the R\*TP Systems, specially modified 32-bit microcomputers running an

enhanced version of the Sybase data base management system from Sybase, Inc. in Berkeley, Calif. The target market is on-line transaction processing—one of the most commercial of all MIS applications.

While there's nothing conclusive to link the two sets of Pyramid announcements, the timing was interesting. Both were revealed Sept. 28. And even if the announcements were unrelated, the effect is the same. The developer who needs to work in both Ada and on-line systems now has the option of doing so.

The point is simply that Ada is much more accessible today than it ever was. That's particularly true when you take into account the fact that there now exist some very good personal computer-based Ada compilers and interpreters, like that of Watcom, Mass.-based Alevs, Inc. Where before it would have been overwhelmingly difficult for MIS to shift to Ada from Cobol, now it is, at least, possible.

But the capability doesn't guarantee that a shift to Ada will actually occur. For Ada to overcome Cobol, it will also have to win over the vast community of Cobol users—a very difficult task. Cobol people are hard to convince; besides, Cobol is immensely appealing.

So will Cobol never die? Eventually, the language will give way to something else.

Yet given the language's staying power, the question is whether Cobol's alternative will be another programming language like Ada or whether Cobol will diminish only when programming languages themselves give way—a day that may not be too long off.

Already, graphically oriented interfaces, natural language systems and code generators foretell the age when much of programmers' work will be done without languages at all. Perhaps tomorrow's programmer will exercise skills more akin to those of a software development manager, whose "subordinate" is an intelligent workstation.

## 1-2-3 tool

Continued from page 44

Users can even export data back to the developer.

Once the spreadsheet has been prepared by a developer (designed and built is the full-service spreadsheet program), it is ready for conversion. @Liberty uses two programs: Prepare compiles the worksheet into stand-alone code; Run executes that converted code.

The program runs on IBM Personal Computer or compatible machines with a minimum of 256K bytes of random-access

memory and IBM PC-DOS or Microsoft MS-DOS Version 2.0 or higher.

The licensing plan for developers is as follows: The buyer pays \$99 for the complete @Liberty package, which includes the Prepare program with its own documentation plus 10 copies of the Run manual.

The spreadsheet designer is authorized to distribute 10 copies of the compiled application and booklets to end users. An @Liberty refill package is available, with licenses and instruction books for 15 additional end users, for \$99.

Circle Reader Service Number 172

## PRODUCT CHECKLIST

Unisoft Corp. has introduced Unitecs, an IBM CICS emulation package for machines running the Unix operating system.

By emulating CICS, Unitecs supplements Unix to facilitate the development and operation of transaction processing systems, just as CICS supplements the functions of IBM's DOS and MVS operating systems.

Pricing for Unitecs in the development environment begins at \$8,000.

Unisoft, 6121 Hollis St., Emeryville, Calif. 94608.

Circle Reader Service Number 173

Candle Corp. has introduced AF/Lifejacket for CICS, an automated facility said to prevent CICS outages and reduce end-user downtime.

AF/Lifejacket automatically intercepts, diagnoses and repairs the most common causes of CICS outages, including storage violations, runaway transactions and bad-system code.

Scheduled for release in the first quarter of 1988, initial pricing for AF/Lifejacket will be \$32,000 for MVS/XA and \$16,000 for non-MVS/XA.

Candle, 1999 Bundy Drive, Los Angeles, Calif. 90025.

Circle Reader Service Number 174

Atron, a division of Northwest Instrument Systems, Inc., has introduced a hardware-assisted

software debugger dubbed the 386/C Probe.

The 386/C Probe, consisting of a motherboard and a plug-back board, is said to have the ability to do a qualified breakpoint, depending upon which routine is accessing specific locations.

Available for Compaq Computer Corp. personal computers or compatibles based on the Intel Corp. 80386 processor, the 386/C Probe costs \$3,995.

Atron, 20665 Fourth St., Saratoga, Calif. 95070.

Circle Reader Service Number 175

Giganox Systems, Inc. has ported its expert control software system, Picon, to the Symbolics, Inc. 3600 and Texas Instruments, Inc. Explorer LISP processors.

Picon is an on-line real-time expert system capable of making decisions based on real-time plant data, heuristic knowledge for process experts and structural analysis of plant elements.

Giganox also announced it has ported its real-time interface, Rtime, to the IBM Personal Computer AT and the Digital Equipment Corp. VAX systems. Rtime is a gateway designed to provide a real-time interface between Picon and external-process control systems.

Giganox's Picon and Rtime are priced at \$28,000, and

\$12,000, respectively.

Giganox Systems, 650 Suffolk St., Lowell, Mass. 01854.

Circle Reader Service Number 176

Software designed to enable users of IBM's CICS to reduce file access in an on-line environment has debuted from Mela Frame Software Products Corp.

The product, called \$ave/IO, holds heavily accessed records in storage, eliminating the need to access a direct access storage device.

License fees range from \$11,900 to \$14,900.

Mela Frame Software Products, 135 Glen Road, Wellesley, Mass. 02181.

Circle Reader Service Number 177

Altai Software, a division of Altai, Inc., has announced the availability of Zack, an automated operations software product designed for IBM's MVS and DOS/VSE operating systems.

Zack's Processing Instruction List was designed after IBM's Rexx language and reportedly provides a simple means of instructing the operating system how to react to a triggering event such as a console message or an operator command.

Introductory pricing of Zack is \$5,000 for the DOS/VSE environment, \$7,000 for Zack/MVS and \$9,000 for MVS/XA.

Altai Software, Suite 150, 624 Six Flags Drive, Arlington, Texas 76011.

Circle Reader Service Number 178

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## CALENDAR

## Dec. 6-12

**T1 Networking.** New York, Dec. 7-8 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

**X.25 Packet Data Systems.** Los Angeles, Dec. 7-8 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

**Telecommunications Management.** San Francisco, Dec. 7-9 — Contact: Busi-

ness Communications Review, 950 York Road, Hinsdale, Ill. 60521.

**The National Connectivity Symposium on Local-Area Networks & Micro-Mainframe Links.** Washington, D.C., Dec. 7-9 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

**Corporate Computing: DEC vs. IBM.** Anaheim, Calif., Dec. 8-9 — Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701. Also being held Feb. 16-17 in New York.

**BOC Information Gateway Service Opportunities.** Washington, D.C., Dec. 8-9 — Contact: Telestrategies, Inc., P.O. Box 811, McLean, Va. 22101.

**Dexco West 87.** Anaheim, Calif., Dec. 8-10 — Contact: Susan Werlich, Exponential International, Inc., 3 Independence Way, Princeton, N.J. 08540.

**Network Management, Control and Problem Determination.** Atlanta, Dec. 8-10 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

**Changes in the Information Center: Traditional Roles Expand to Sup-**

port OA and PCs. San Francisco, Dec. 9-11 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402. Also being held March 21-23 in Atlanta.

**The IBM PC, PS/2 & Compatibles: Maximizing Their Potential.** New York, Dec. 10-11 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

**Introduction to ISDN: Concepts, Technology & Applications.** Washington, D.C., Dec. 10-11 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

## Dec. 13-19

**DB2/SQL: How to Use Them Effectively.** White Plains, N.Y., Dec. 14 — Contact: Nancy Carafa, Atr International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

**The Expert Systems and Artificial Intelligence Symposium.** Atlanta, Dec. 14-16 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held Jan. 25-27 in San Francisco.

**Data Networks: Management, Operation and Control.** Dallas, Dec. 14-16 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

**The 1987 Microcomputer Graphics Show & Conference.** New York, Dec. 16-18 — Contact: Susan Werlich, Exponential International, Inc., 3 Independence Way, Princeton, N.J. 08540.

## Jan. 10-16

**User-Centered Requirements Analysis: The New Approach for Specifying User Needs for Computer Applications.** Palo Alto, Calif., Jan. 11-13 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

**Software Engineering and CASE Technology.** Dallas, Jan. 12-13 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held March 3-4 in Philadelphia.

**Application Prototyping: Implementing the New Systems Development Technology.** Philadelphia, Jan. 13-14 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held March 3-4 in Denver.

## Jan. 24-30

**Neural Networks For Artificial Intelligence.** Los Angeles, Jan. 25-27 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

**Communications Networks Conference & Expo.** Washington D.C., Jan. 28 — Contact: International Data Group Conference Management Group, CN '88, P.O. Box 9171, Framingham, Mass. 01701.

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PAUL CUBBAGE  
DATAQUEST, INC.

See story page 40

## next issue

**C**omputerworld Focus rings in the new year with an update on communications and connectivity. We'll analyze the top global telecommunications issues as well as zero in on the 1988 wish lists and buying plans of MIS managers in the U.S. From the pros and cons of IBM's Systems Application Architecture to net management systems to our Special Section on local-area networks, Focus gives you insights into technological and market strategies that will help you pull together a cohesive, successful communications package for the upcoming months.

## The absence of ethics

Thomas Roberts

**E**thics, or the lack of them, are always a big deal. With events such as the Iran-Contra scandal and the insider trading mess staring us in the face, it's well they should be.

In our corner of the world, however, we haven't been hearing quite so much lately about the computer industry's pet ethical peeve, software piracy. Does that mean that all those ADAPSO advertisements depicting unmasked software pirates befuddled by shame have actually cured the problem? If you're so naive to think so, allow me to give you a dose of better judgment.

I've recently had the chance to come into close, candid contact with a number of people who, in large part, are representative of the computer industry's bread and butter. These people are students at one of the East Coast's top business schools. If those tired business school sagas are even partly true, many of these students will grow up to be the supermanagers and movers and shakers of tomorrow. These people, along with their peers nationwide, will have a profound effect on the health and direction of the computer industry in the future.

Unfortunately, a casual survey of these students' attitudes toward software piracy revealed two discoveries. First, many of them have little understanding of the fact that unauthorized duplication of software is a criminal offense. In fact, a good percentage has no idea that there may be even the slightest problem with indiscriminately exercising the DOS COPY command.

The second revelation is that those students that are aware they are ripping off intellectual property don't much care. Their attitude can best be summed up by the phrase, "Everyone else does it, so why shouldn't I?"

Now, the fact that a few thousand students across the country are not paying for their software will not have a great financial impact. The scary thing is, however, that many of these people will be setting the direction for large departments and even whole companies during the next several decades.

Once they graduate, will these students miraculously become more ethical business people? The argument could be made that the personal financial pressure of business school accelerates the process of software piracy. But the evidence so far shows that competition and financial pressures for MBAs in the real world cause ethical breaches that make copying floppy disks look about as harmful as pitching pennies. The recent Wall Street scandals committed by newly minted MBAs have so shaken the nation's business schools that many are considering making courses in ethics a requirement.

While education is certainly part of the answer to software thievery, it certainly won't cure the problem. It is essential that the software industry understands that piracy is becoming a noisome with the business leaders of tomorrow.

Roberts is an independent consultant and writer based in New York.



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